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SATURN SA-203 POSTFLIGHT TRAJECTORY

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ABSTRACT

This report presents the postflight trajectory for the Saturn SA-203 test flight. The primary mission of SA-203, the second of the Saturn IB series, was to study the behavior of liquid hydrogen in an orbital environment. Trajectory-dependent parameters are given in earth-fixed, space-fixed ephemeris and geographic coordinate systems. A complete time history of the powered flight trajectory is presented at 1.0 sec intervals from guidance reference release to S-IB/S-IVB separation and at 5.0 sec intervals from S-IB/S-IVB separation to insertion. Tables of insertion conditions and various orbital parameters are included in a discussion of the orbital portion of flight.

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RESEARCH AND DEVELOPMENT OPERATIONS

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

LIST OF TABLES

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SUMMARY

The powered flight trajectory presented here was established from data provided by external electrical and optical tracking systems and the onboard data provided by the ST-124M guidance platform. External data were available from fixed cameras, ODOP, GLOTRAC, GLOTRAC Station I and C-band radar. The final powered flight trajectory was composed of ODOP, GLOTRAC Station I, C-band radar and telemetered guidance data. The GLOTRAC data were the worst received on the past several Saturn vehicles and were not used in the postflight trajectory.

The S-IVB payload at insertion (443.348 sec) had a space-fixed velocity 0.8 m/s (2.6 ft/s) greater than nominal, a perigee altitude of 2.8 km (1.5 nm) greater than nominal and the flight path angle was 0.008 deg less than nominal.

1.0 INTRODUCTION

The SA-203 vehicle was launched from Cape Kennedy on July 5, 1966 at 9:53:17 Eastern Standard Time. Approximately 7 min and 13 sec after launch, the S-IVB stage's J-2 engine was shut down and the S-IVB stage which contained the liquid hydrogen (LH_2) experiment was inserted into orbit. Near the end of the fourth revolution the S-IVB stage lost its structural integrity.

SA-203 was the second flight test of the S-IB and S-IVB stages of the uprated Saturn I vehicle. The purpose of the LH_2 experiment was to study the behavior of liquid hydrogen in orbit and gather the necessary information to determine S-IVB stage restart capability. The evaluation of the experiment can be found in Reference 3.

All times in this report are referenced to Range Zero (9:53:17 Eastern Standard Time) unless otherwise specified. The time of first motion was determined as 0.63 sec after Range Zero. This time was defined by the launch area camera coverage. Guidance reference release time was determined to be 4.485 sec before Range Zero, by comparing accelerometer data telemetered in range time with data from the guidance computer which are telemetered in computer time.

Acknowledgement is given to the Data Reduction Branch of the Computation Laboratory for their support in the preparation of the tabulated trajectory data.

2.0 COORDINATE SYSTEMS AND TRAJECTORY PARAMETERS

The translational displacement of the vehicle's center of gravity is tabulated in several coordinate systems (described in the Appendix). An initial displacement of 29.2 m (95.8 ft) locates the vehicle's center of gravity in the coordinate system whose origin lies on the reference ellipsoid.

The representative model for the earth and its gravitational field is the Fischer Ellipsoid of 1960. All latitude and longitude coordinates are defined with respect to this ellipsoid.

The geographic coordinates and gravity data for launch pad 37B at Cape Kennedy are:

Geodetic Latitude	28.531857 deg N
Longitude	80.564953 deg W
Acceleration of Gravity	9.818 m/s^2 (32.21 ft/s^2)

The elevations above the reference ellipsoid are:

Base of launch pedestal	5.6 m (18.4 ft)
C.G. at first motion	33.9 m(111.2 ft)

The azimuth alignments are:

Launch Azimuth	90.0 deg E of N
Flight Azimuth	72.0 deg E of N
ST-124M Platform Azimuth	72.0 deg E of N

3.0 POWERED FLIGHT TRAJECTORY ANALYSIS

3.1 Data Sources

Tracking data were available from first motion through insertion (S-IVB CO + 10 sec). The times of tracking systems coverage are illustrated in Figure 1 and itemized in Table I.

The difficulty in maintaining tracking during first stage cutoff and separation experienced on the Saturn I vehicles has not been noted on the first two Saturn IB vehicles, AS-201 and AS-203.

3.1.1 Antenna Locations

The antenna locations for the various tracking systems and the vehicle's center of gravity versus time are shown in Figure 2. The tracking data used in establishing the reference trajectory were transformed from their reference points (antenna locations) to the vehicle's center of gravity. This was done to provide a common reference point for all tracking systems.

3.1.2 GLOTRAC

Reduced metric GLOTRAC data were available from 30 sec through powered flight. Comparisons between GLOTRAC and the reference trajectory are shown in Figures 6 through 8. These comparisons in the earth-fixed plumbline coordinate show maximum deviations of 50 m (164 ft) in XE, 65 m (213 ft) in YE, and 67 m (220 ft) in ZE. Although these deviations were not unusually large, the data were very rough, particularly in the velocity components. The YE component makes a shift of nearly 70 m (230 ft) at 260 sec which is the approximate time of handover from

the uprange transmitter to the downrange transmitter. The GLOTRAC data were the worst received on the past several Saturn vehicles and were not used in the postflight trajectory. Additional information on the SA-203 GLOTRAC data can be found in Reference 1.

3.1.3 ODOP

Data from the ODOP tracking system were availabte from liftoff to 112 sec and from 125 sec to 143 seconds. ODOP was not used directly in the trajectory as on the past several vehicles, but it was used as input to the MARLOCK program and weighted to have significant influence on the initial portion of the trajectory. Comparisons between ODOP and the reference trajectory are shown in Figures 6 through 8. The maximum difference was 30 m (98 ft) in the YE components at 140 seconds.

3.1.4 GLOTRAC Station 1

GLOTRAC Station 1 furnished an independent set of usable tracking data between 54 and 161 seconds. These data were not as good as usual and therefore, they were weighted to have less influence in the MARLOCK program than the ODOP data. Comparisons between GLOTRAC Station 1 and the reference trajectory (Figures 6 through 8) show maximum deviations of approximately 37 m (121 ft) in XE, 55 m (180 ft) in YE and 20 m (66 ft) in ZE.

3.1.5 Radar

The Merritt Island (19.18) radar provided data from 15 sec throughout the powered flight. Just prior to 100 sec the data had rather large deviations. On AS-201 there was also a large deviation in the elevation angle prior to 100 seconds. The maximum deviation in range after 100 sec is 22 m (72 ft). The azimuth angle agrees very well with the reference trajectory while the elevation angle is biased by about 0.03 deg. Comparisons with the reference trajectory are shown in Figures 3 through 5.

The Grand Turk (7.18) radar data were reliable from 200 sec throughout powered flight. There is a small bias of about 0.02 deg in the elevation angle. The maximum deviation in range is about 30 m (98 ft). Comparisons with the reference trajectory are shown in Figures 3 through 5.

Patrick (0.18) radar seemed to have some of the same problems as Merritt Island (19.18) radar. There are large deviations in all measurements until about 150 sec of flight. After this time the Patrick data are excellent; in fact, overall it is the best radar data available on SA-203. Comparisons with the reference trajectory are shown in Figure 3 through 5.

The Grand Bahama (3.18) radar furnished data from 82 sec throughout powered flight. Comparisons with the reference trajectory are shown in Figures 3 through 5. The range measurement attained a maximum deviation of 83 m (263 ft) at 280 seconds. The elevation angle was biased approximately 0.03 deg and took a sudden shift of about 0.025 deg at 380 seconds. This radar was weighted to have less influence in the MARLOCK program than the other radar data.

The Bermuda (BDA) radar furnished data from 265 sec throughout powered flight. Comparisons with the reference trajectory are shown in Figures 3 through 5. The elevation angle contained a small bias of approximately 0.02 deg. The range and azimuth angle measurements were in very good agreement with the reference trajectory. This is the best radar data from Bermuda of the past several vehicles.

3.2 Trajectory Composition

The entire powered flight trajectory from first motion to insertion was established by the MARLOCK trajectory construction program. The MARLOCK program uses the telemetered guidance velocity data as the generating parameter to compute a trajectory which will best fit the tracking observations, yet retain the smoothness of the guidance data. The guidance data can vary only in accordance with the coefficients assigned to each term of an eighteen-term guidance error model. The guidance error coefficients are determined using the Kalman linear filtering technique and then applied to the telemetered guidance data to yield a continuous best estimate type of trajectory.

The following is a summary of the tracking data used in the MARLOCK program to obtain the final postflight trajectory on SA-203:

Data Source	Type	Time Interval	Sample Frequency
ODOP	Earth-Fixed Positions	20 - 110	2 points per second
GLOTRAC Station 1	Earth-Fixed Positions	70 - 135	2 points per second
Patrick (0.18) radar	Measured Parameters	150 - 400	1 point per second
Grand Bahama (3.18) radar	Measured Parameters	120 - 135 155 - 400	1 point per second
Grand Turk (7.18) radar	Measured Parameters	225 - 430 440 - 490	1 point per second

Merritt Island (19.18) Radar	Measured Parameters	150 - 420	1 point per second
Bermuda (BDA) Radar	Measured Parameters	270 - 430 440 - 550	1 point per second

The MARLOCK program was also constrained to fit the position and velocity components at insertion that were obtained by the Orbital Correction Program (OCP). It should also be noted that observations were used in MARLOCK after insertion. This was done to get a better estimate of the guidance error coefficients at the insertion time since all least square type solutions diverge near the end of the fitting span.

3.2.1 First Motion Time

A first motion time of 0.63 sec was determined from camera coverage. The pad measurements 32-B01 and 32-B02 (Displacement at Stub Fins I and III) which are normally used to obtain first motion time were unreadable.

3.2.2 Powered Flight Trajectory

Table II presents a comparison of actual and nominal times of some of the vehicle events in sequential order. The actual altitude and surface range are shown in Figures 9 and 10, respectively, for the entire powered flight. The total inertial acceleration profile for the powered flight is shown in Figure 11. The earth-fixed velocity vector and the angle between the earth-fixed velocity vector and the local horizontal plane are shown in Figure 12. The space-fixed velocity vector and the angle between the space-fixed velocity vector and the local horizontal plane (flight path angle) are shown in Figure 13. Mach number and dynamic pressure are shown for S-IB powered flight in Figure 14. These parameters were calculated using measured meteorological data to an altitude of 60 km (32 nm). Above this altitude the U.S. Standard Reference Atmosphere was used.

Various trajectory parameters are given at significant times in Table III. It should be noted that apex, loss of telemetry signal and impact apply only to the discarded S-IB stage. Several parameters are given for S-IB stage inboard engine cutoff (IECO), S-IB stage outboard engine cutoff (OECO) and S-IVB stage cutoff (S-IVB CO) in Table IV. The velocity gain between OECO and separation due to thrust decay was 2.9 m/s (9.5 ft/s). The velocity gain from S-IVB CO to the end of thrust decay was 9.1 m/s (29.9 ft/s), according to the telemetered guidance data.

A comparison of the actual and nominal trajectory may be found in Reference 3. The nominal trajectory is presented in Reference 2.

The actual trajectory is presented in the metric system of units in Tables X through XII and in the English system of units in Tables XIII through XV.

3.3 Error Analysis of the Reference Trajectory

Data from the various high precision tracking systems are compared in the earth-fixed plumbline coordinate system with the reference trajectory in Figures 6 through 8. All data were smoothed and transferred from the point of track (antenna locations) to a common point, the vehicle's center of gravity. These curves show only the trend of the data relative to the reference trajectory. The dispersion of the various data gives an indication of the validity of the reference trajectory. During the S-IB portion of the powered flight, the differences between the reference trajectory and ODOP, GLOTRAC and GLOTRAC Station I,respectively, are less than 40 m (131 ft). Since there was quite a bit of trouble experienced by the GLOTRAC system later in flight, the reliability of all the GLOTRAC and GLOTRAC Station I data are questionable.

Comparisons of the radar measured parameters with the reference trajectory are shown in Figures 3 through 5. With the exception of GBI (3.18) radar all of the range deviations are less than 40 m (131 ft). All of the azimuth angles agree with the reference trajectory within about 0.02 deg. With the exception of Patrick (0.18) radar, all of the elevation angle measurements appear to contain biases of 0.02 to 0.03 degrees.

An estimate of the probable total uncertainty in the powered flight reference trajectory is presented in Figure 15. At OECO the position components are probably accurate to 30 m (98 ft) and the velocity components to 0.3 m/s (1.0 ft/s); by S-IVB CO, the maximum uncertainties have increased to 250 m (820 ft) in position components and 1.0 m/s (3.3 ft/s) in velocity components.

4.0 S-IB STAGE FREE FLIGHT TRAJECTORY

A theoretical free flight trajectory was computed for the discarded S-IB stage using initial conditions from the reference trajectory. Nominal retro-rocket performance and outboard engine thrust decay were assumed. No radar tracking data were available on the S-IB stage after separation to confirm the results obtained by the free flight trajectory simulation.

Since the attitude angles of the stage during re-entry were unknown, nominal tumbling drag coefficients were assumed. In addition, nominal coefficients of drag were used assuming the stage (1) stabilized at an angle of attack of 90 deg, (2) stabilized at an angle of attack of 0 deg and (3) stabilized at an angle of attack of 180 deg. These provide the following dispersions:

Drag Conditions	Impact Range	Impact Time
Tumbling	809.01 km (436.83 nm)	584.2 sec
0 deg Angle of Attack	820.05 km (442.79 nm)	525.7 sec
90 deg Angle of Attack	802.92 km (433.54 nm)	631.9 sec
180 deg Angle of Attack	817.07 km (441.18 nm)	537.2 sec

The theoretical free flight trajectory utilizing the tumbling drag coefficient data will be considered as the actual trajectory. The impact location relative to the launch site is shown in Figure 16. The S-IB stage trajectory after separation is presented in tabular form in Tables XVI (metric units) and XVII (English units).

5.0 ORBITAL FLIGHT

5.1 Orbital Trajectory

The SA-203 S-IVB stage was inserted into orbit July 5, 1966 at 15:00:40.348 U.T. (443.348 sec). The orbital parameters were determined using a least squares differential correction procedure with C-band radar tracking data as observations.

The primary mission of the SA-203 flight was to observe the behavior of liquid hydrogen (LH_2) in an orbital environment. The venting activity resulting from this experiment imparted sufficient force to the vehicle to significantly change the characteristics of the orbit. Therefore, it was decided that the only way to adequately determine the orbital trajectory would be to define the orbital parameters for each revolution. The times associated with the second, third, and fourth revolutions were arbitrarily chosen to be approximately when the vehicle crossed the 80 deg West longitude meridian. The orbital elements at insertion and for the three succeeding revolutions are shown in Table V. Values for other orbital parameters for the beginning of each revolution are listed in Table VI.

Special low range accelerometers were mounted on the SA-203 vehicle to measure the acceleration in orbit due to venting. However, due to some malfunction no usable data were obtained from these accelerometers beyond the first pass over Bermuda and the Canary Islands. It was then necessary to obtain the venting profile from these less accurate sources, namely, tank pressure measurements or the inertial guidance

system. The acceleration profiles obtained from the tank pressures and from the guidance were not the same and neither fitted the tracking data as well as was desired. By shifting the levels of some of the venting impulses, a fairly good fit of the tracking data was obtained. The acceleration profiles due to venting that were used in the Orbital Correction Program (OCP) for each revolution are shown in Table VIII. It should not be construed to mean that this venting profile is more accurate or more likely, but it is presented here merely to show what was used in the OCP to obtain the orbital parameters presented in Table VI. Work is continuing on an analysis of the problems caused by venting in an orbital solution, and the methods that must be applied to surmount these problems. This analysis will be published at a later date.

The stations used in obtaining the initial conditions for each revolution, the number of observations and the Root Mean Square (RMS) error of the residuals associated with each data type are shown in Table VII. The RMS residual errors quoted represent the difference between the actual radar observations and the calculated observations based on the orbital ephemeris defined by the initial conditions. Included in the RMS residual errors are high frequency errors (assumed Gaussian), systematic errors due to instrumentation biases, mathematical model error and atmospheric refraction errors. The maximum RMS error of the radar residuals was 23 m (75 ft) in range, 0.03 deg in elevation and 0.01 deg in azimuth. According to design specifications the expected high frequency errors of the measuring systems are 3 m (10 ft) in range, and 0.005 deg in the angles for the FPQ-6 and TPQ-18 radars; 6 m (20 ft) in range, and 0.01 deg in the angles for the FPS-16 radars. It should be noted that some of the data overlap and are used both at the end of one revolution and at the beginning of the next. This was done in an attempt to minimize the discontinuities between the revolutions.

Obvious systematic bias errors are present in some of the azimuth and elevation residuals. The relative weighting of the observations used in the solutions, according to the expected high frequency errors, requires that the solutions be primarily determined by the range observations. Therefore, for the most part, bias errors of the magnitudes observed do not affect the solution parameters shown by any appreciable amount. One noticeable exception is a 55 deg bias which was removed from Woomera azimuth data.

5.2 Orbital Trajectory Analysis

Insertion condition solutions were made using Bermuda data at insertion, the Carnarvon and Woomera data and the White Sands and Merritt Island data at the end of the first and beginning of the second earth revolutions, respectively, in various combinations. Solutions

were obtained for all data sources using different venting profiles (from guidance and from tank pressures). Considering the reasonable solutions, the insertion parameters are accurate to 250 m (820 ft) in position components and 1.0 m/s (3.3 ft/s) in velocity components.

An independent solution of the orbital insertion parameters using powered flight tracking and guidance data shows a maximum deviation of 150 m (492 ft) and 1.0 m/s (3.3 ft/s) in any position or velocity component compared to the orbital tracking insertion solution quoted. The powered flight trajectory quoted has been constrained to the orbital tracking insertion elements shown in Table V.

The relative agreements between the independent orbital and powered flight solutions indicate a maximum error in the quoted insertion position and velocity components of 250 m (820 ft) and 1.0 m/s (3.3 ft/s), respectively.

Initial conditions were obtained at the beginning of each revolution. There are some discontinuities if the initial conditions of one revolution are integrated forward to the beginning time of the next revolutions. These discontinuities are less than 600 m (1968 ft) in position components and less than 2 m/s (7 ft/s) in velocity components. These discontinuities can most likely be attributed to the uncertainty in the venting model.

5.3 Orbital Tracking Summary

Orbital tracking of the SA-203 vehicle was conducted by the NASA Space and Tracking and Data Acquisition Network (STADAN). The network is composed of the Minitrack and Minitrack Optical Tracking Stations, the Manned Space Flight Network (MSFN) supported by elements of DOD (a global network of tracking stations), and additional optical tracking support by the Smithsonian Astrophysical Observatory (SAO) optical tracking network. No optical tracking data were received, and there was no Minitrack beacon aboard SA-203, so the tracking data utilized consisted entirely of radar data from the MSFN.

Table IX summarizes the tracking data received for the orbital lifetime of the SA-203 vehicle from insertion until structural integrity failed near the end of revolution 4 or beginning of revolution 5. The last valid radar track was obtained by the Hawaii tracking station on revolution 4. Merritt Island received some telemetry from the vehicle at the beginning of revolution 5. An abrupt loss of telemetry signal occurred near the scheduled end of this period of tracking. The next station scheduled to track was Trinidad; however, this station tracked approximately 200 pieces of debris. It is assumed that breakup occurred in the interval between Merritt Island loss of signal and Trinidad acquisition. This is shown as the shaded area on the map, Figure 17.

The venting model used is presented in Table VIII. The acceleration magnitudes listed for the continuous vents were broken down into the Space-Fixed Ephemeris Coordinate System components and these were added directly to the Cowell equations of motion in the same ratio as the velocity components at the corresponding integration time step. The magnitude of acceleration applicable between begin and end times was determined by a two-point linear interpolation scheme. Those vents listed as "impulses" were simply added to the velocities at the time listed.

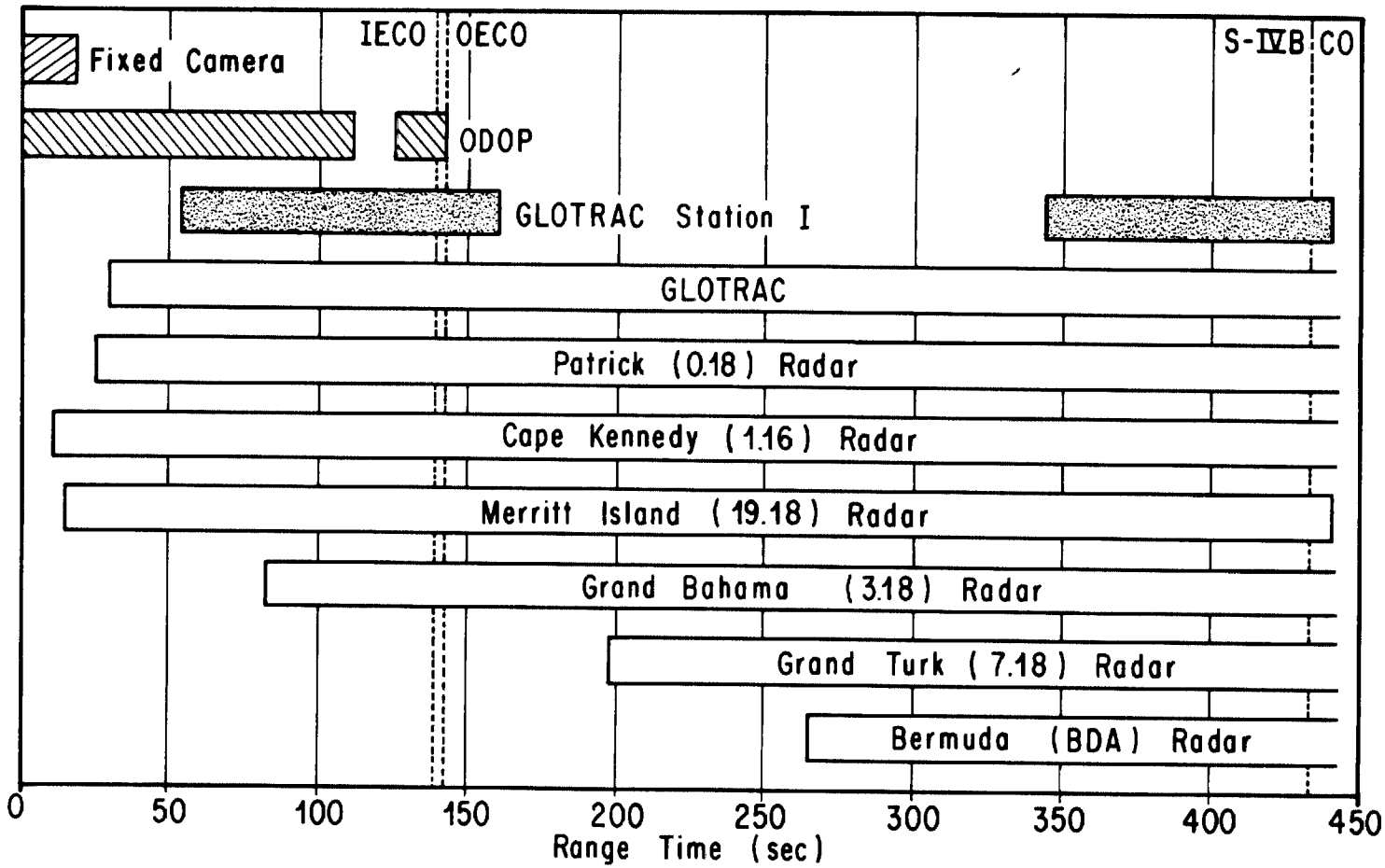

FIG. 1. AVAILABLE FINAL TRACKING DATA (POWERED FLIGHT)

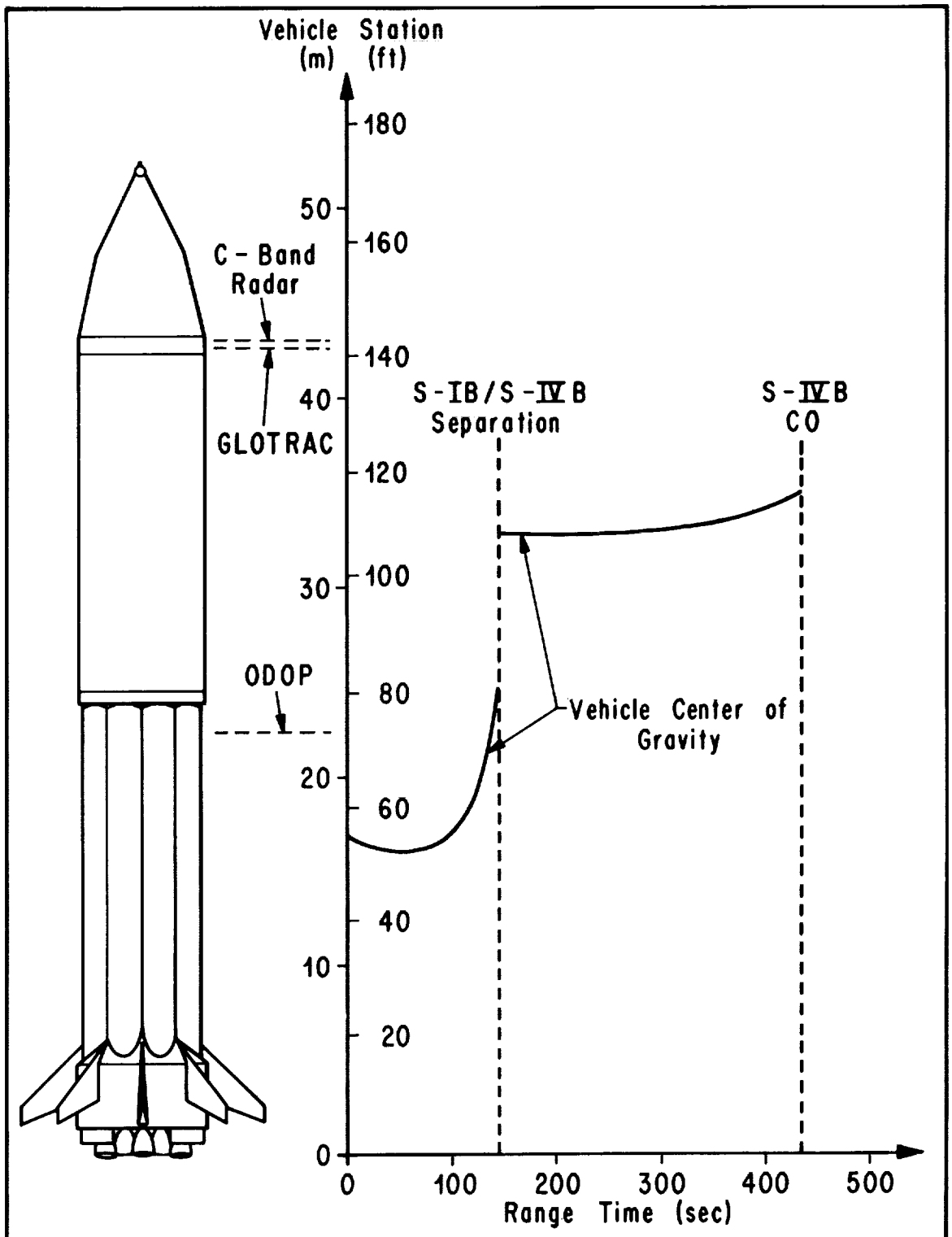

FIG. 2. ANTENNA LOCATIONS AND CENTER OF GRAVITY

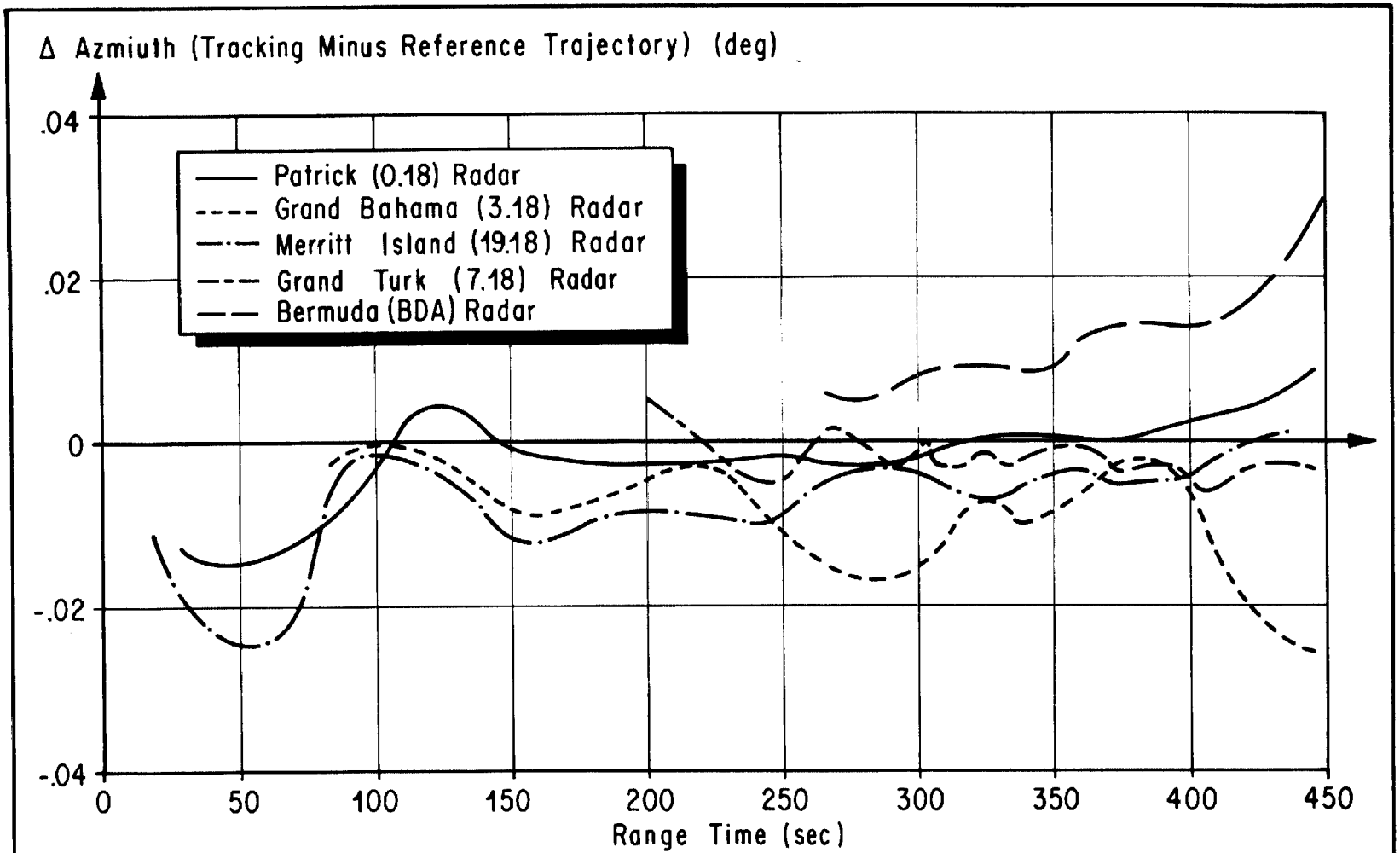

FIG. 3. MEASURED PARAMETER TRACKING COMPARISONS

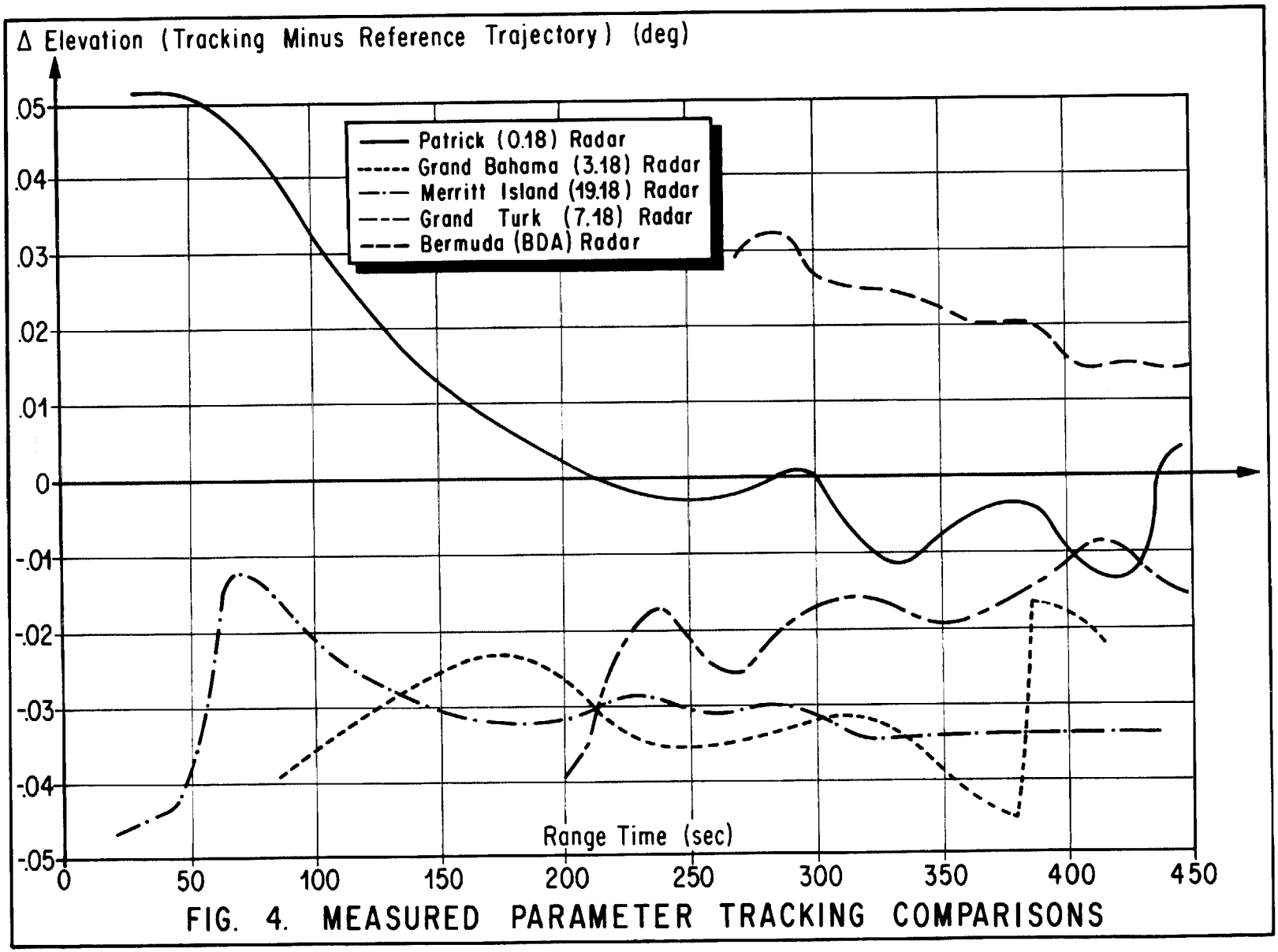

FIG. 4. MEASURED PARAMETER TRACKING COMPARISONS

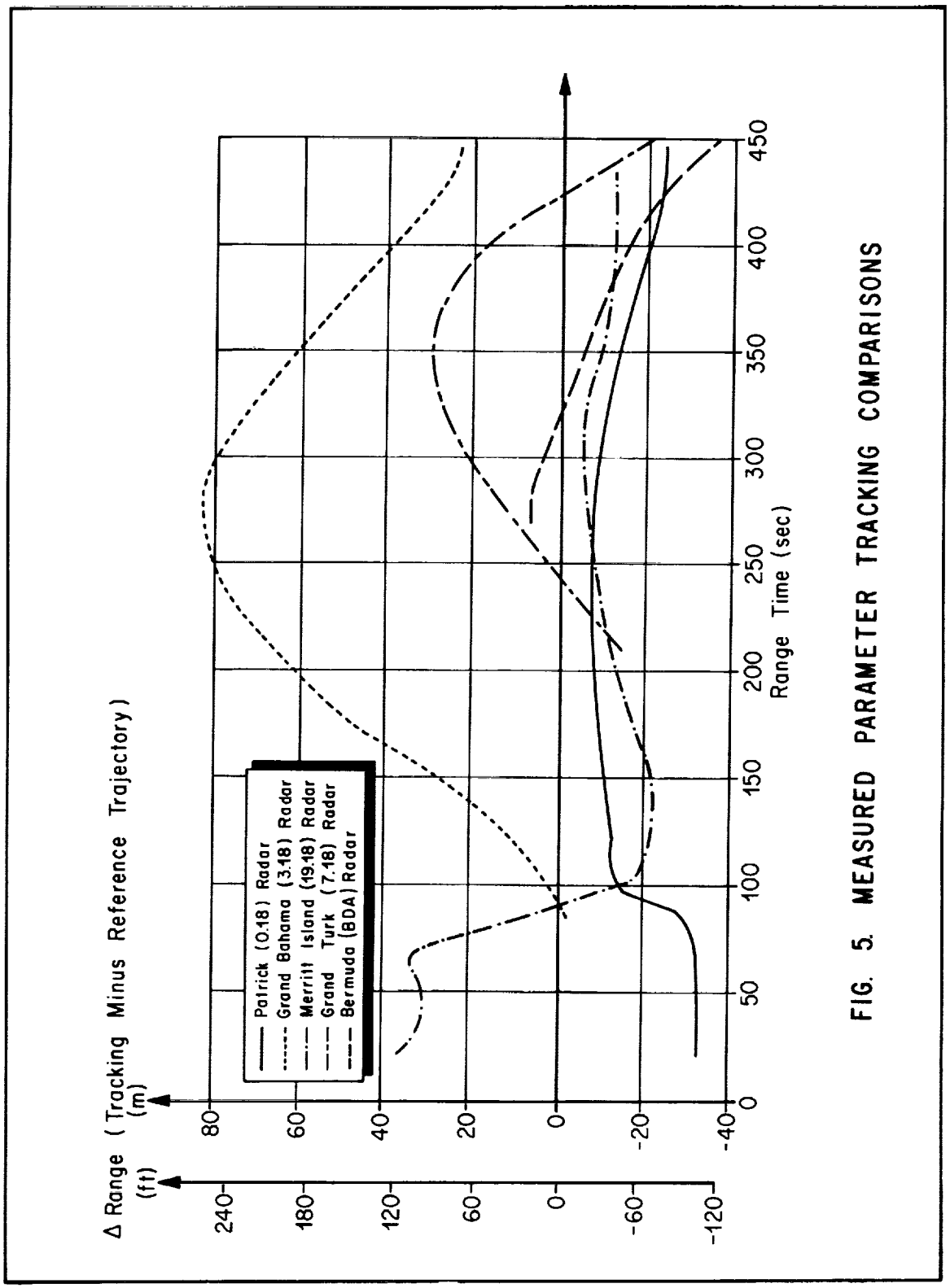

FIG. 5. MEASURED PARAMETER TRACKING COMPARISONS

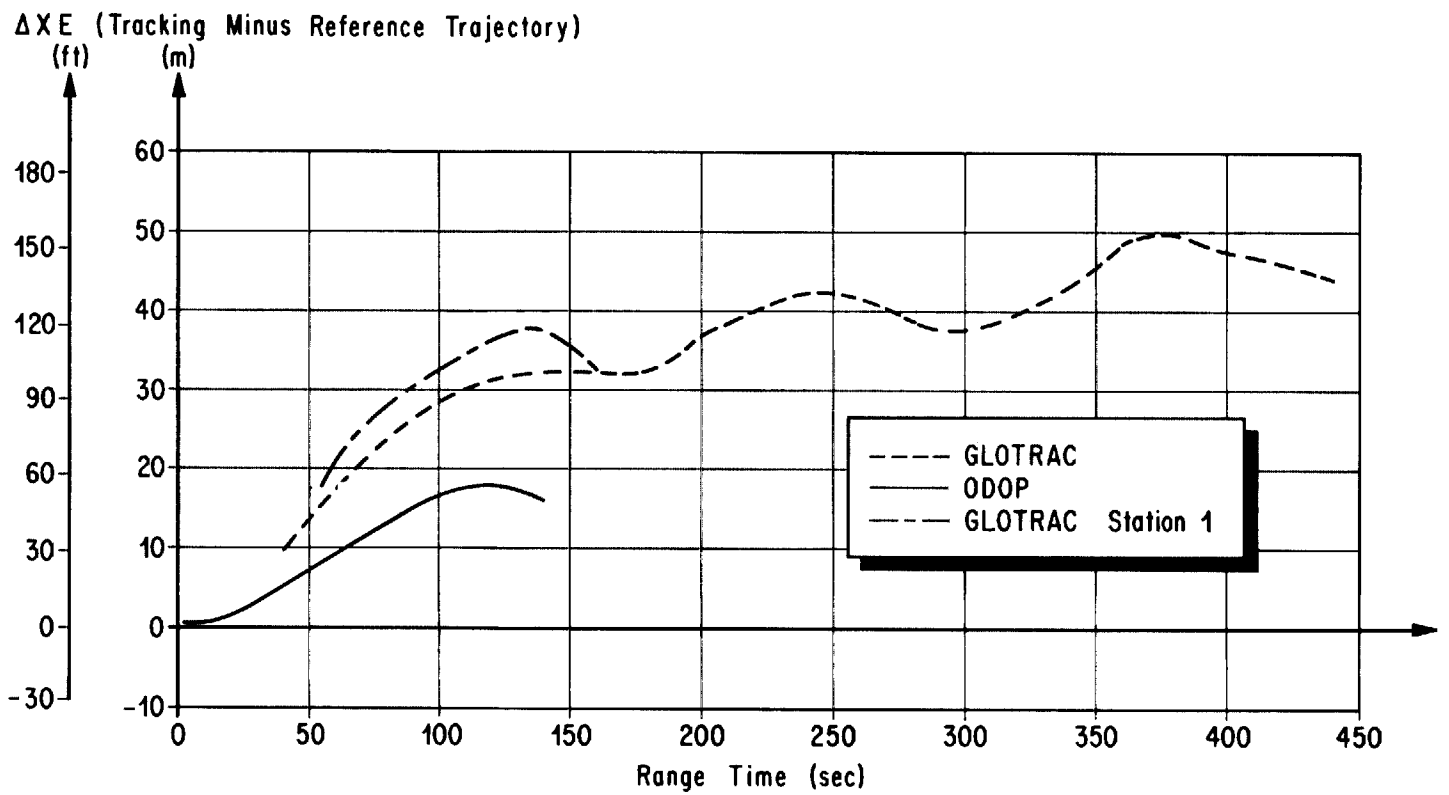

FIG. 6. METRIC TRACKING COMPARISONS

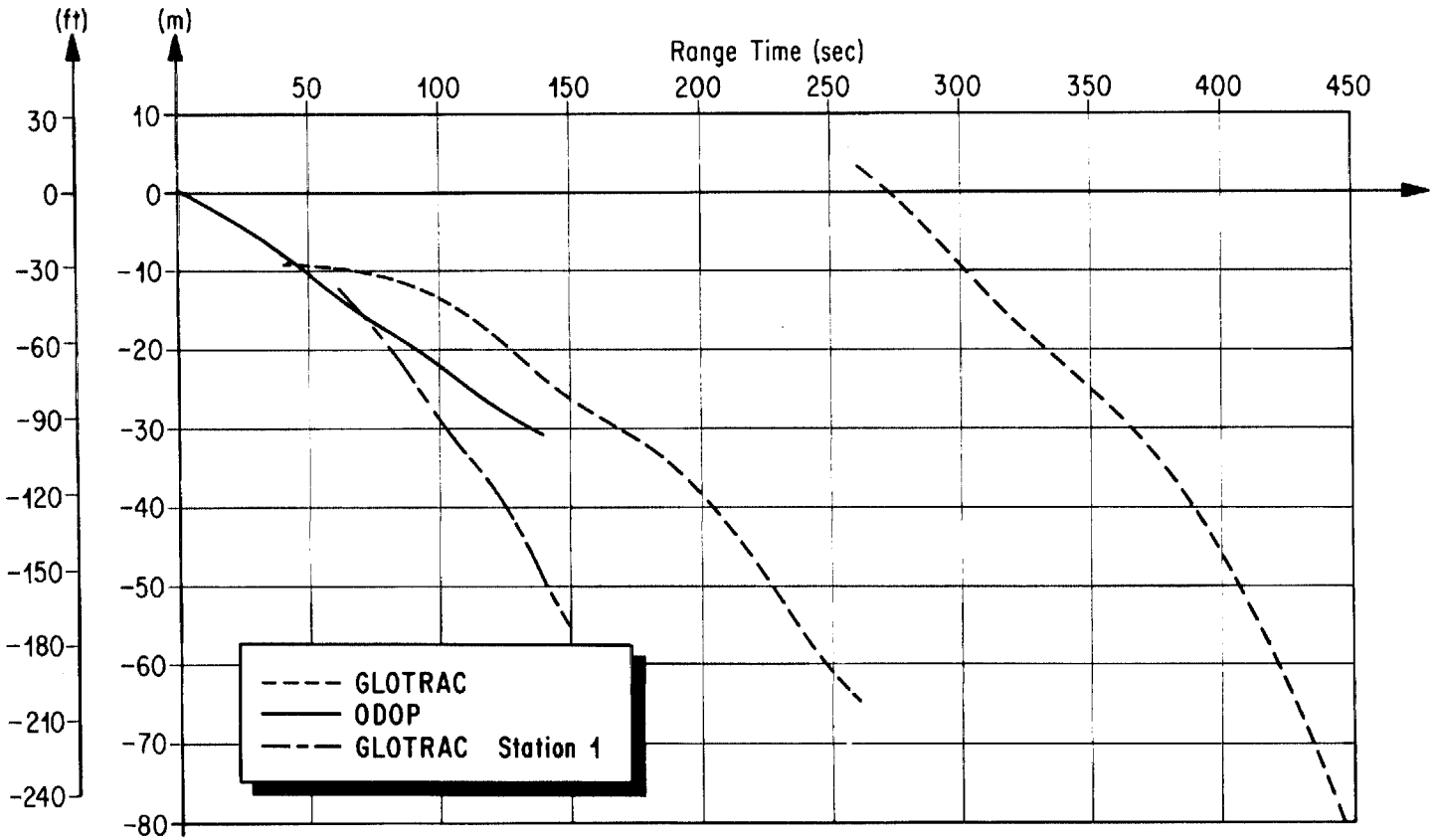

FIG. 7. METRIC TRACKING COMPARISONS

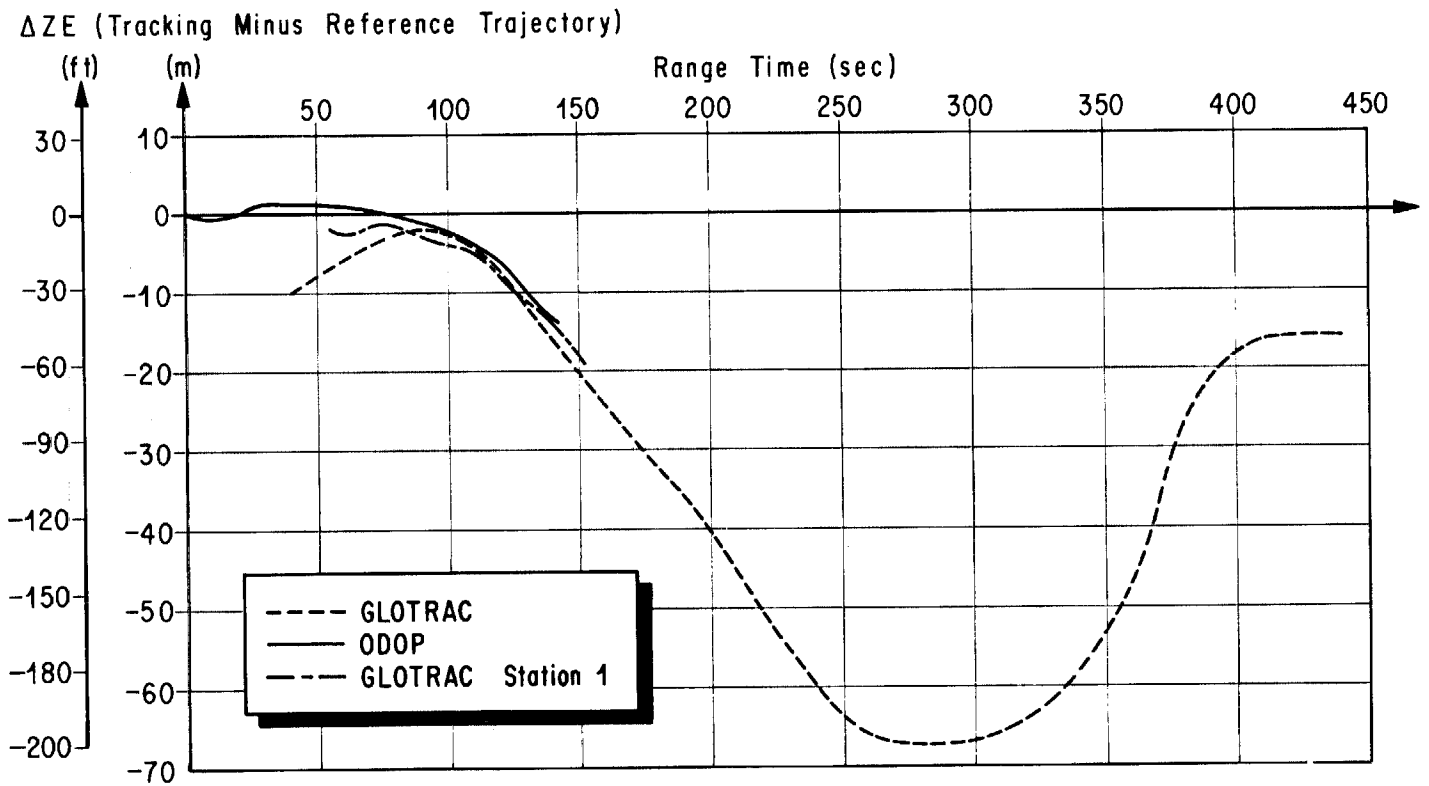

FIG. 8. METRIC TRACKING COMPARISONS

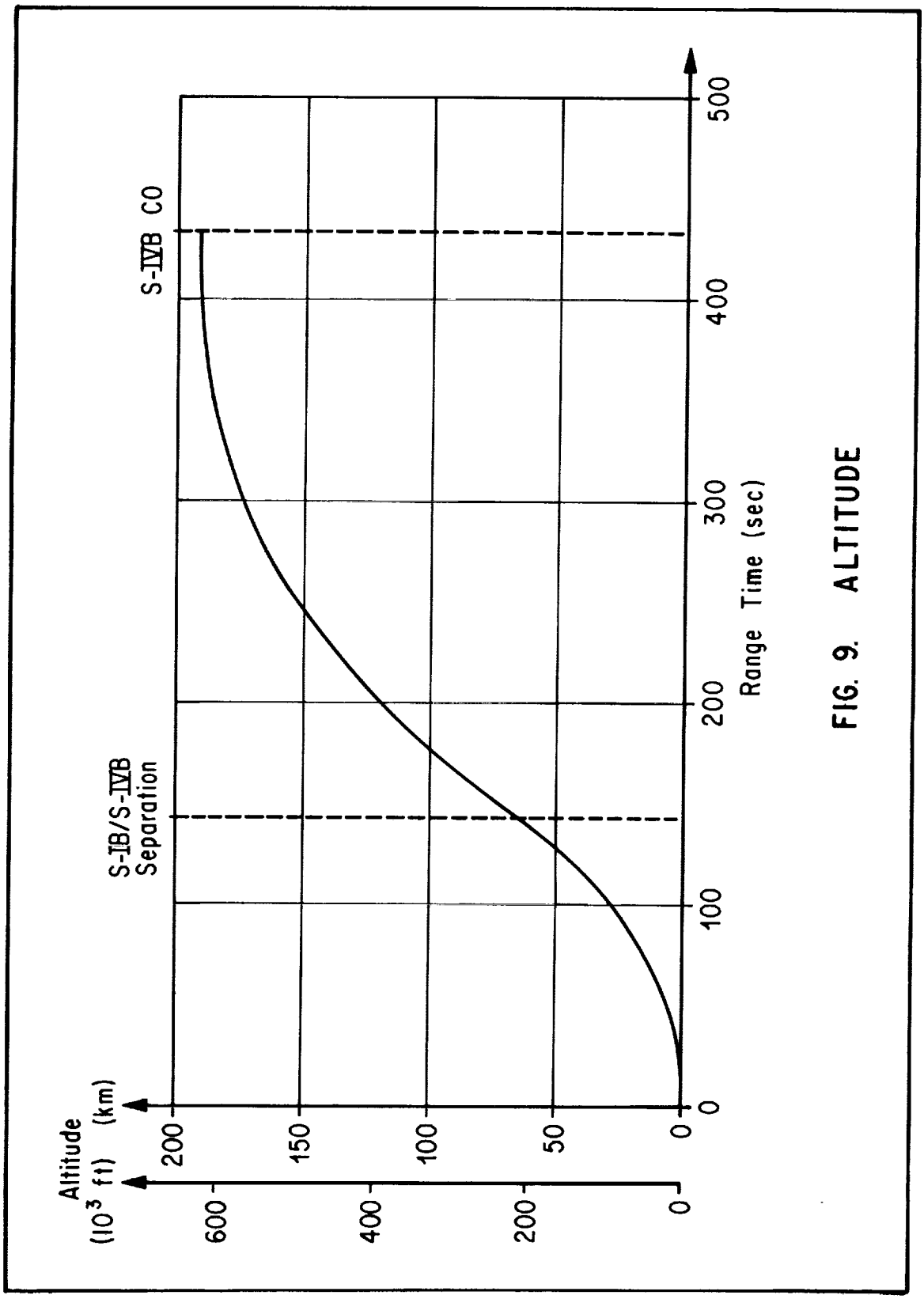

FIG. 9. ALTITUDE

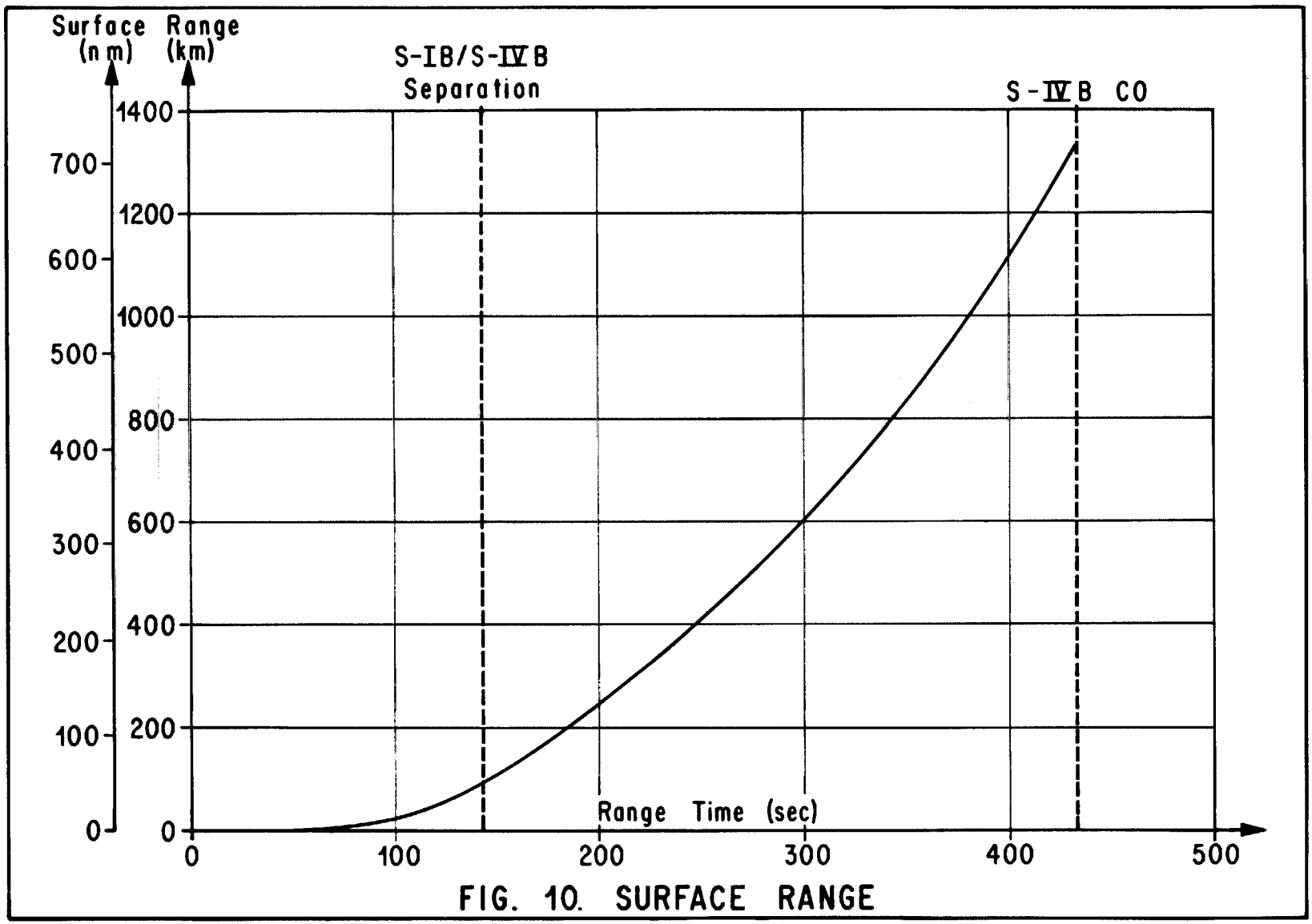

FIG. 10. SURFACE RANGE

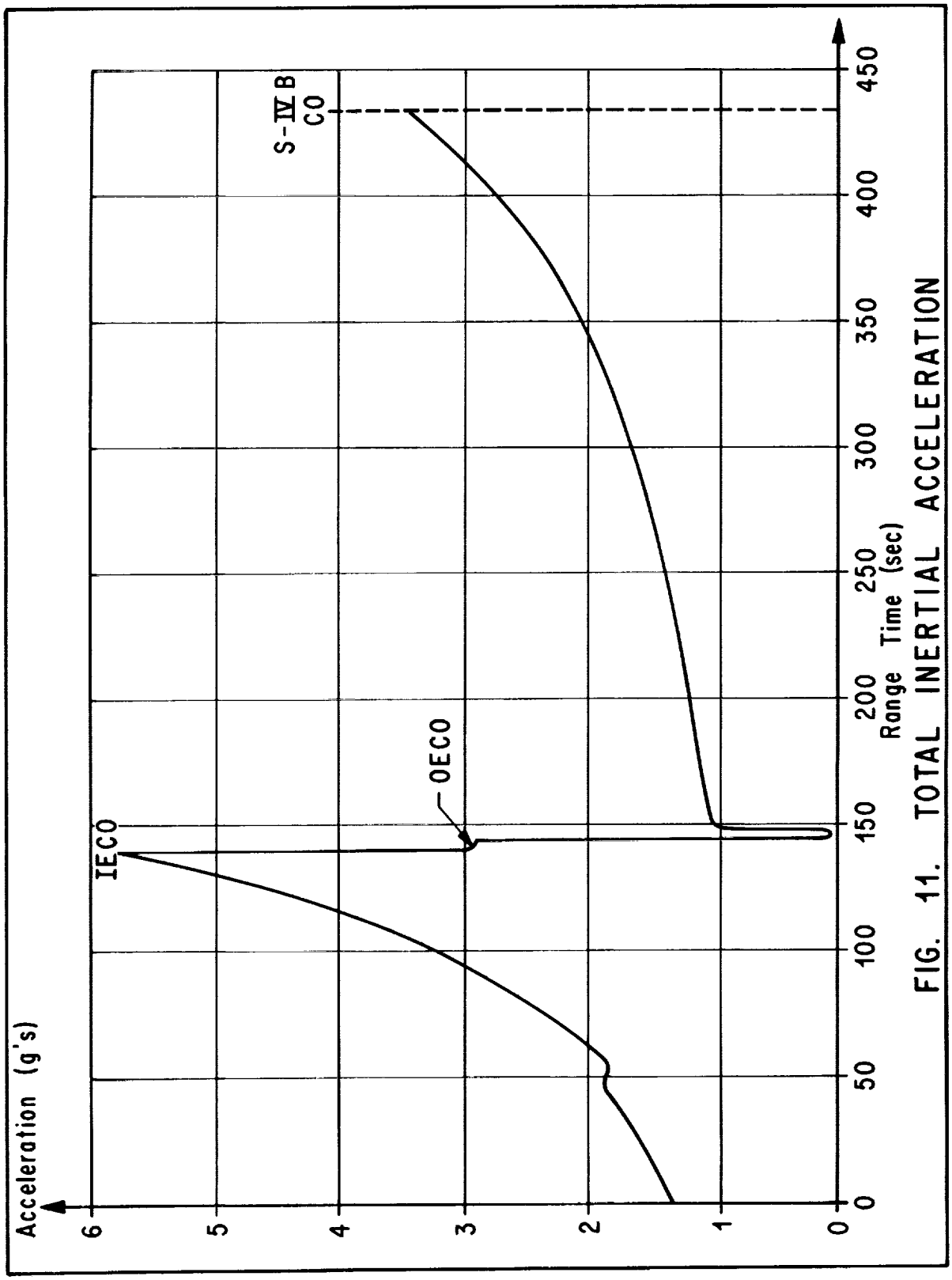

FIG. 11. TOTAL INERTIAL ACCELERATION

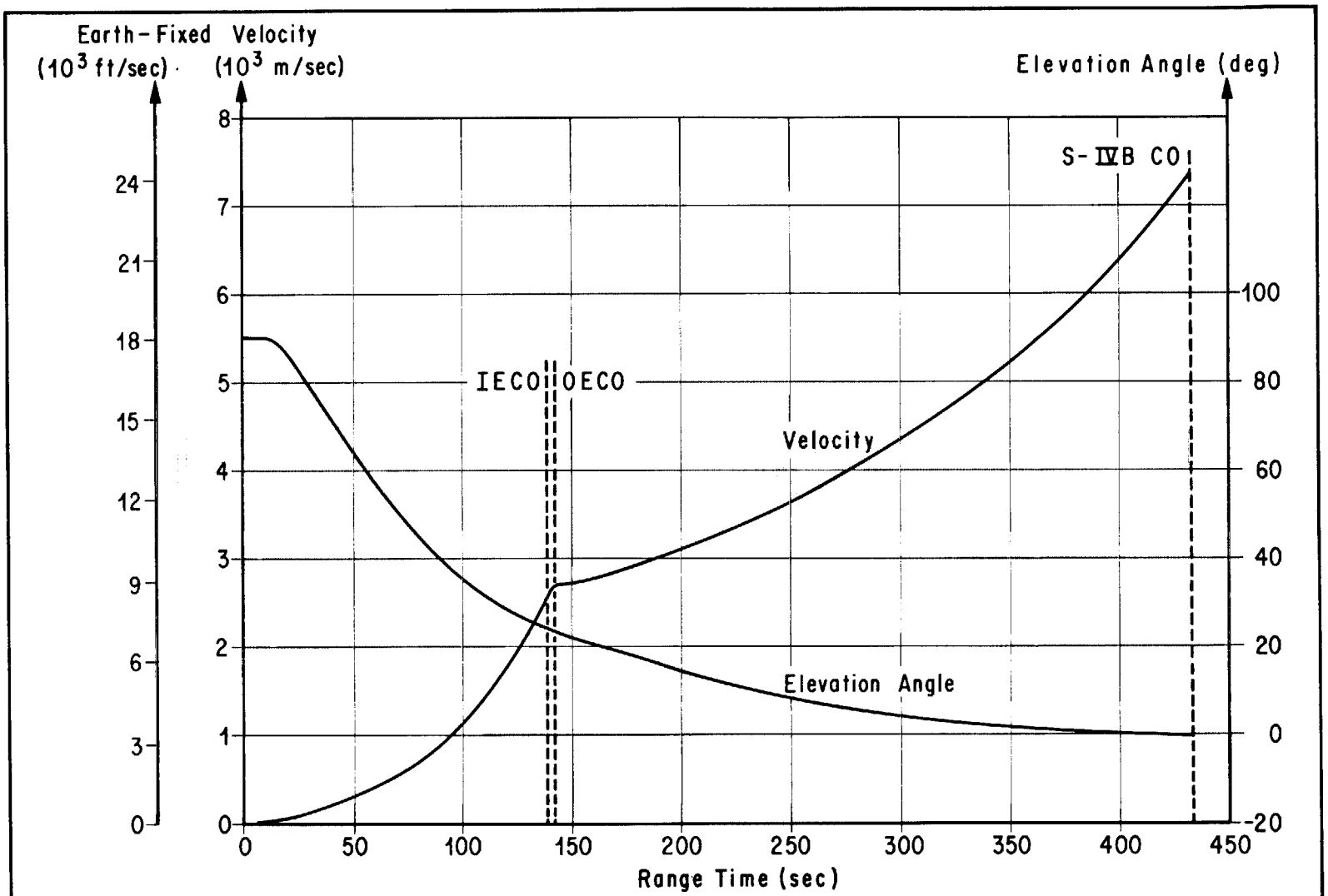

FIG. 12. EARTH-FIXED VELOCITY AND ELEVATION ANGLE

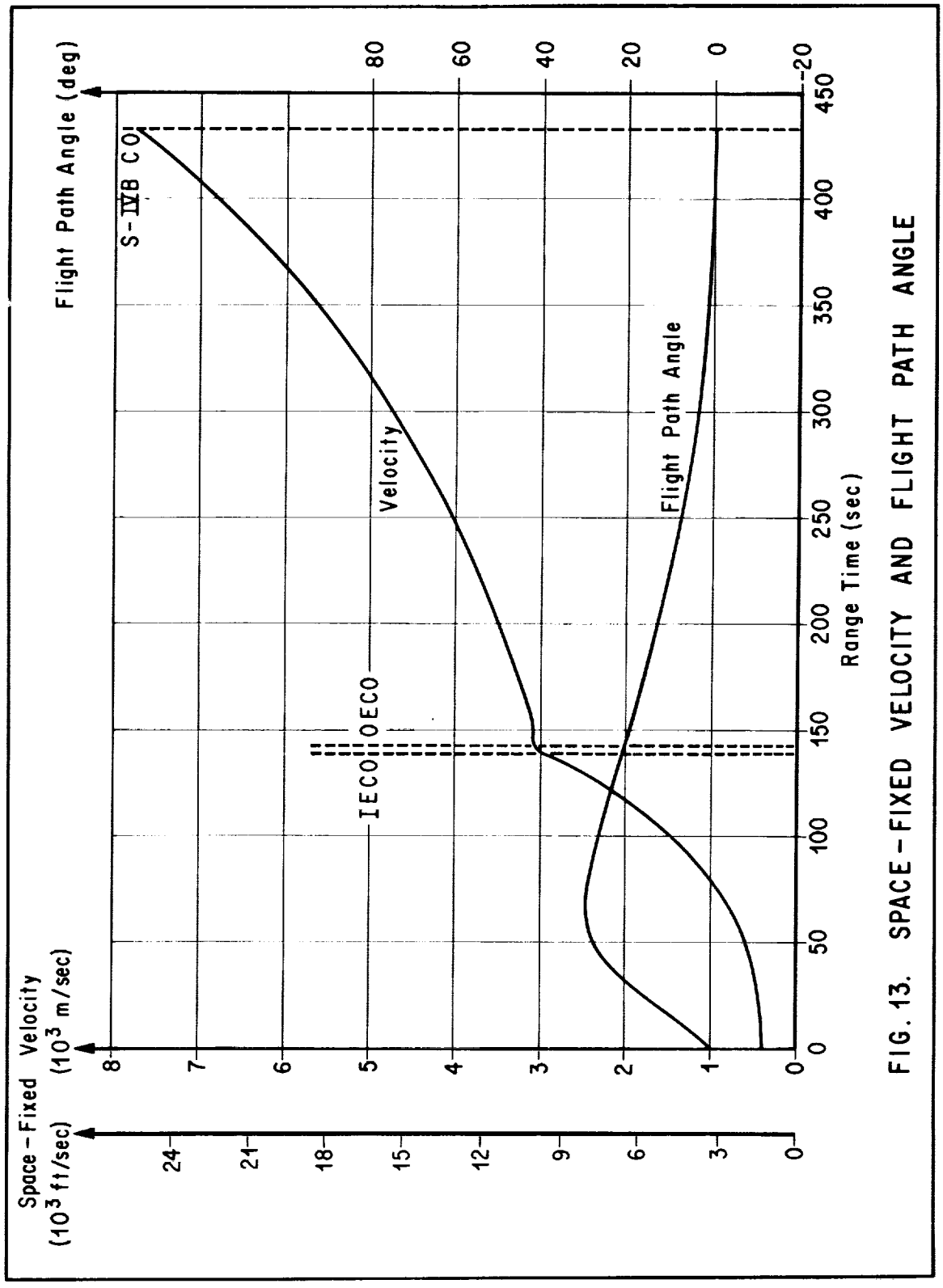

FIG. 13. SPACE-FIXED VELOCITY AND FLIGHT PATH ANGLE

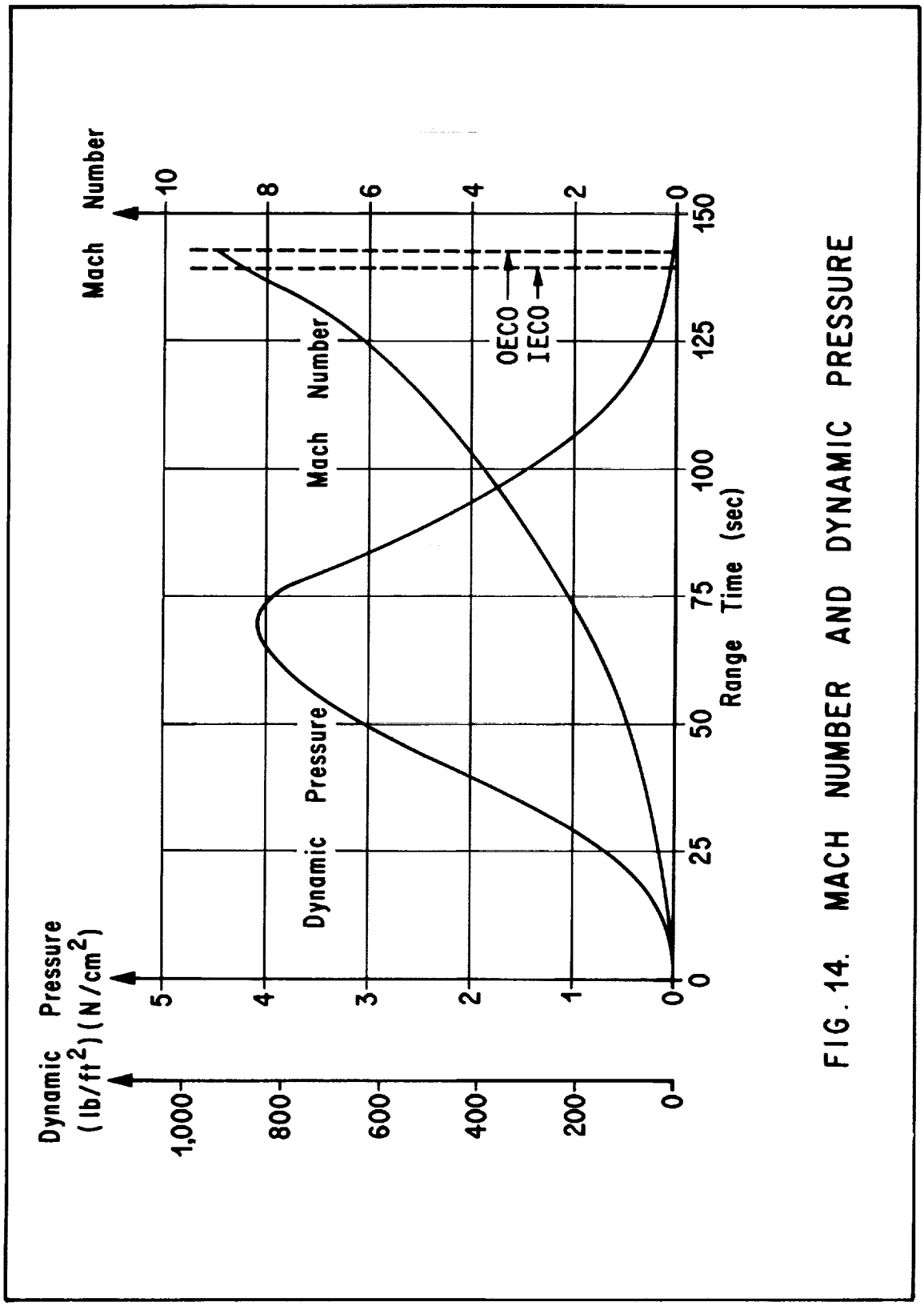

FIG. 14. MACH NUMBER AND DYNAMIC PRESSURE

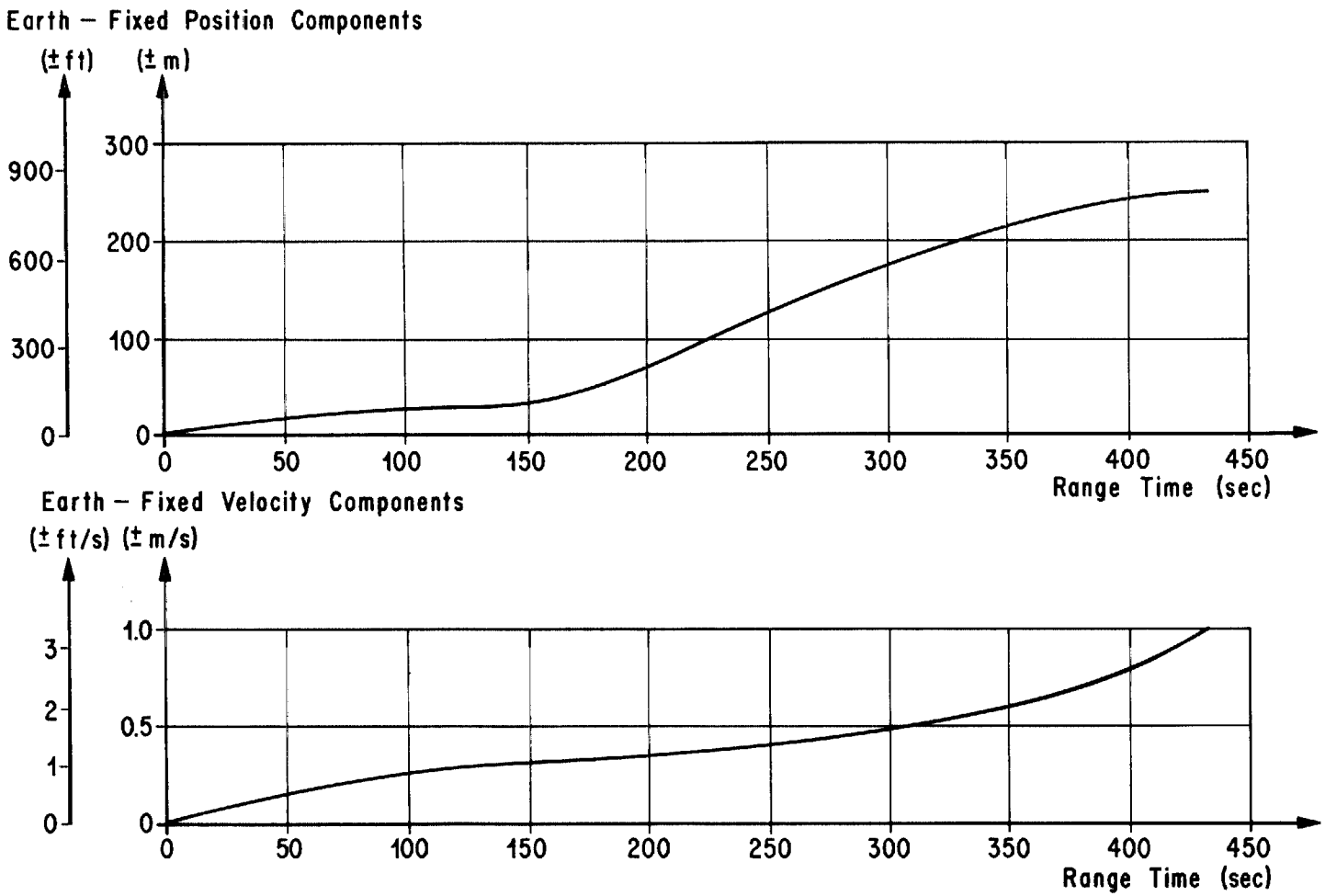

FIG. 15. ESTIMATED UNCERTAINTY OF REFERENCE TRAJECTORY

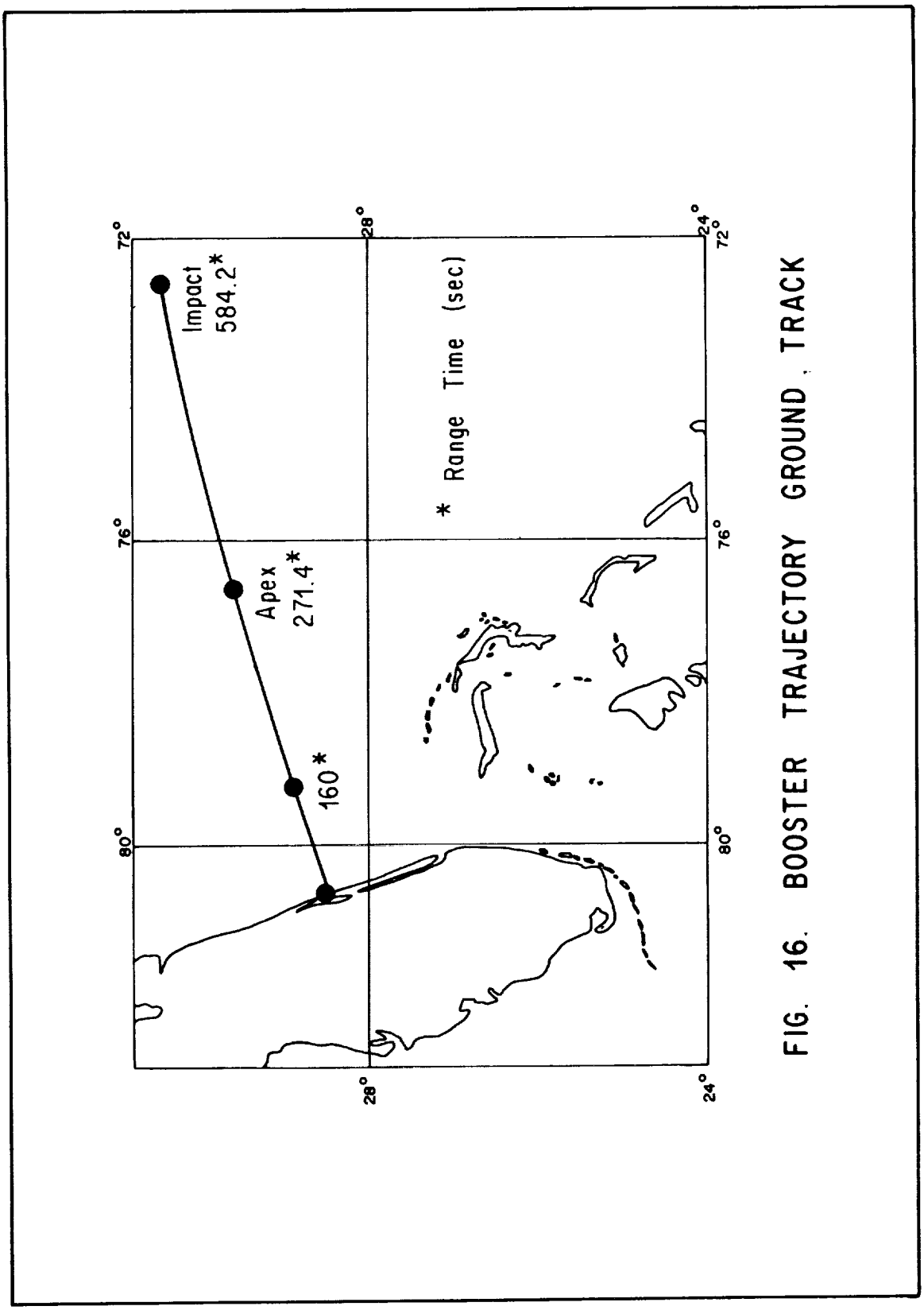

FIG. 16. BOOSTER TRAJECTORY GROUND TRACK

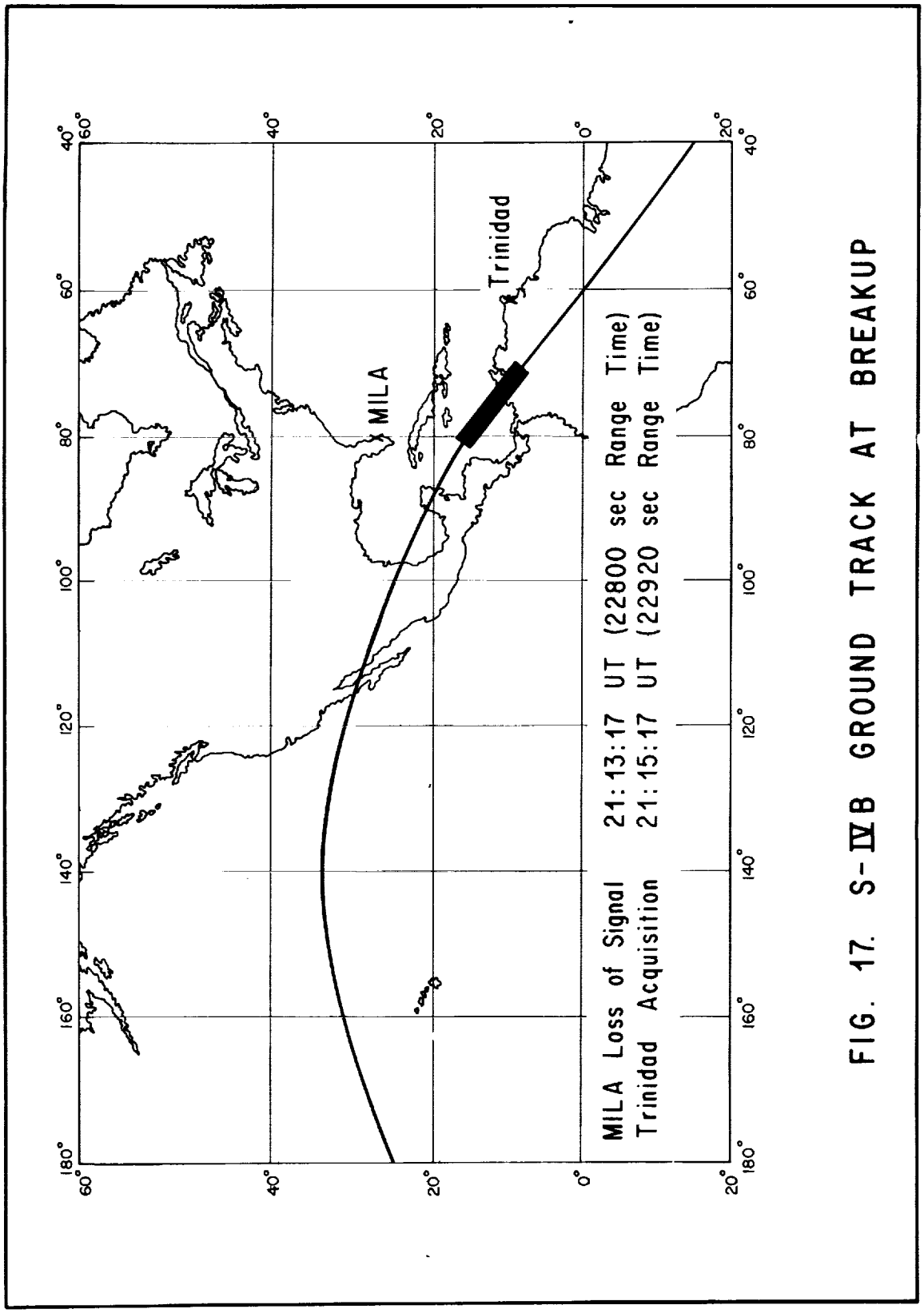

FIG. 17. S-IVB GROUND TRACK AT BREAKUP

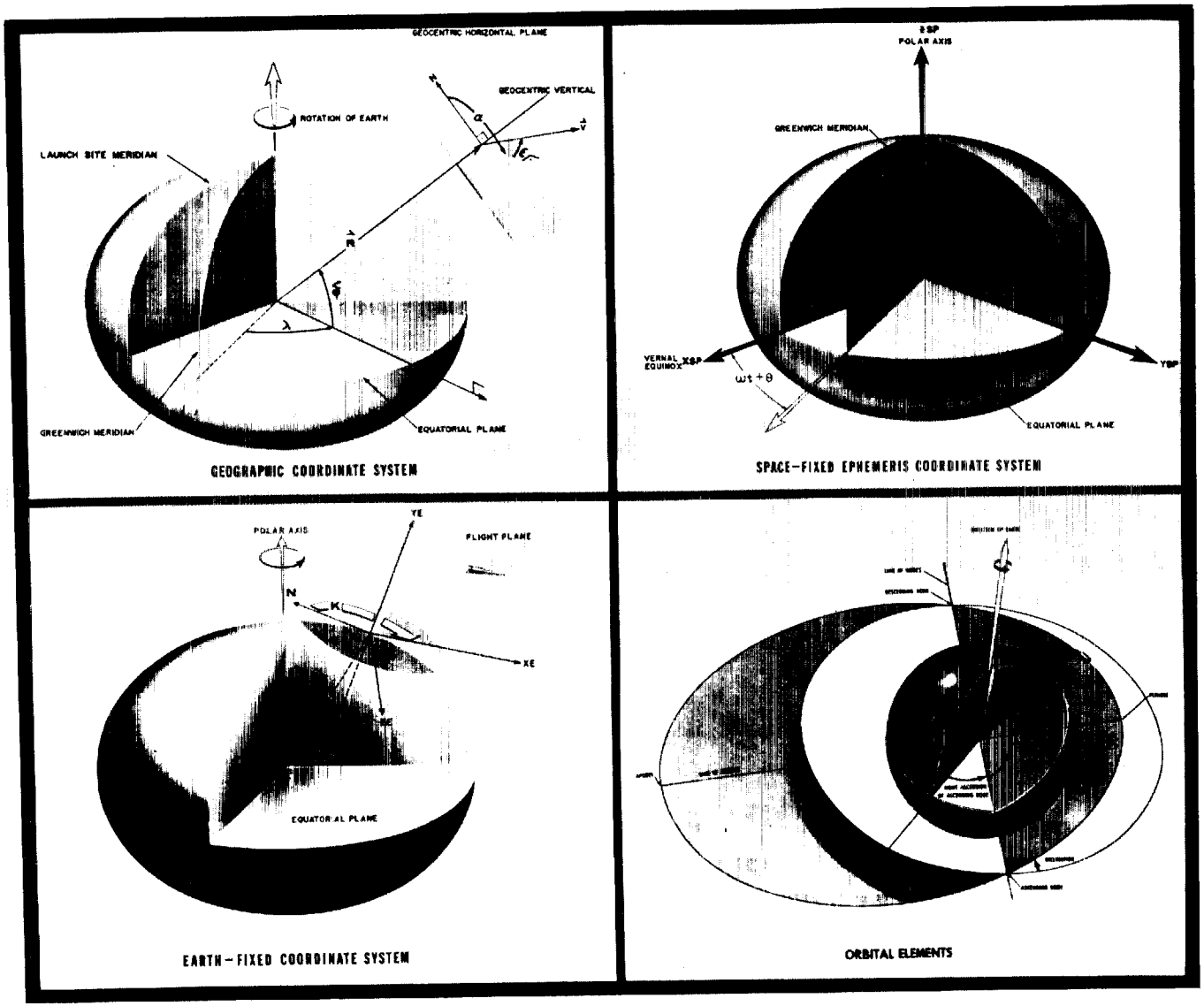

FIG. 18. TRAJECTORY COORDINATE SYSTEMS

TABLE I

TRACKING DATA SOURCES (POWERED FLIGHT)

Data Source	Time Available (sec)
Fixed Camera	0 - 19
ODOP	0 - 112 125 - 143
GLOTRAC Station I	54 - 161 344 - 441
GLOTRAC	30 - 443
Patrick (0.18) Radar (FPQ-6)	25 - 443
Cape Kennedy (1.16) Radar (FPS-16)	10 - 260
Merritt Island (19.18) Radar (TPQ-18)	15 - 441
Grand Bahama (3.18) Radar (TPQ-18)	82 - 443
Grand Turk (7.18) Radar (TPQ-18)	198 - 443
Bermuda (BDA) Radar (FPS-16)	265 - 443

TABLE II

TIMES OF EVENTS

Event	Range Time		
	Actual	Nominal	Act-Nom
Guidance Reference Release	-4.485		
First Motion	0.63	0.63	0.00
Liftoff Signal	0.86	0.83	0.03
Pitch Command	12.2	10.8	1.4
Roll Command	12.2	10.8	1.4
Roll Completed	30.1	28.8	1.3
Tilt Arrest	133.9	134.6	-0.7
Inboard Engine Cutoff	139.24	140.44	-1.20
Outboard Engine Cutoff	142.68	143.44	-0.76
Separation	143.44	144.24	-0.80
S-IVB Ignition	144.89	145.64	-0.75
Start IGM	158.49	157.73	0.76
S-IVB Guidance Cutoff Signal	433.348	436.253	-2.905
Orbital Insertion	443.348	446.253	-2.905

TABLE III

SIGNIFICANT TRAJECTORY PARAMETERS

Event	Parameters	Actual Value
First Motion	Range Time	0.63 sec
	Total Inertial Acceleration	13.41 m/s^2 (43.98 ft/s^2)
Mach 1	Range Time	51.55 sec
	Altitude	6.67 km (3.60 nm)
Maximum Dynamic Pressure	Range Time	70.00 sec
	Dynamic Pressure	4.10 n/cm^2 (856.3 lb/ft^2)
	Altitude	13.18 km (7.12 nm)
Maximum Total Inertial Acceleration (S-IB Stage)	Range Time	139.3 sec
	Acceleration	57.10 m/s^2 (187.29 ft/s^2)
Maximum Earth-Fixed Velocity (S-IB Stage)	Range Time	143.1 sec
	Velocity	2718.9 m/s (8918.0 ft/s)
S-IB/S-IVB Separation	Range Time	143.4 sec
	Surface Range	95.75 km (51.70 nm)
	Altitude	66.82 km (36.08 nm)
	Cross Range	0.62 km (0.33 nm)
	Space-Fixed Velocity	3086.2 m/s (10122.7 ft/s)
	Flight Path Angle	20.18 deg

TABLE III (CONT'D)

Event	Parameter	Actual Value
Apex (S-IB Stage)	Range Time	271.4 sec
	Altitude	133.99 km (72.35 nm)
	Surface Range	403.8 km (217.87 nm)
	Earth-Fixed Velocity	2434.3 m/s (7984.5 ft/s)
Loss of Telemetry (S-IB Stage)	Range Time	425.0 sec
	Altitude	37.99 km (20.51 nm)
	Surface Range	771.65 km (416.66 nm)
	Total Earth-Fixed Acceleration	-20.38 m/s^2 (66.85 ft/s^2)
	Elevation Angle from Pad	-0.66 deg
Impact (S-IB Stage)	Range Time	584.2 sec
	Surface Range	809.00 km (436.83 nm)
	Cross Range	10.00 km (5.40 nm)
	Geodetic Latitude	30.4620 deg
	Longitude	72.5167 deg
Maximum Total Inertial Acceleration (S-IVB Stage)	Range Time	433.5 sec
	Acceleration	34.17 m/s^2 (112.08 ft/s^2)
Maximum Earth-Fixed Velocity (S-IVB Stage)	Range Time	435.1 sec
	Velocity	7387.8 m/s (24232.0 ft/s)

TABLE IV

CUTOFF CONDITIONS

Parameters	IECO	OECO	S-IVB CO
Range Time	139.24 sec	142.68 sec	433.348 sec
Altitude	62.34 km (33.66 nm)	66.01 km (35.64 nm)	191.01 km (103.14 nm)
Range	85.53 km (46.18 nm)	93.87 km (50.69 nm)	1336.87 km (721.85 nm)
Cross Range, ZE	0.59 km (0.32 nm)	0.62 km (0.33 nm)	41.50 km (22.41 nm)
Cross Range Velocity, DZE	7.0 m/s (23.0 ft/s)	7.6 m/s (24.9 ft/s)	356.6 m/s (1169.6 ft/s)
Earth-Fixed Velocity	2620.7 m/s (8595.9 ft/s)	2714.5 m/s (8901.9 ft/s)	7378.7 m/s (24202.1 ft/s)
Earth-Fixed Velocity Vector Elevation	23.783 deg	23.182 deg	-0.003 deg
Earth-Fixed Velocity Vector Azimuth	72.499 deg	72.547 deg	81.557 deg
Space-Fixed Velocity	2987.1 m/s (9797.7 ft/s)	3082.3 m/s (10109.9 ft/s)	7784.5 m/s (25539.7 ft/s)
Total Inertial Acceleration	57.03 m/s^2 (187.06 ft/s^2)	28.59 m/s^2 (93.78 ft/s^2)	33.97 m/s^2 (111.42 ft/s^2)

Earth-Fixed Velocity Accuracy

OECO	$\pm$0.3 m/s ($\pm$1.0 ft/s)
S-IVB CO	$\pm$1.0 m/s ($\pm$2.3 ft/s)

Altitude Accuracy

OECO	$\pm$ 30 m ($\pm$ 98 ft)
S-IVB CO	$\pm$250 m ($\pm$820 ft)

TABLE V

ORBITAL ELEMENTS AT THE BEGINNING OF EACH REVOLUTION

Parameters		Revolution 1	Revolution 2	Revolution 3	Revolution 4
Time	(hr:min:sec U.T.)	15:00:40.348	16:27:08	18:00:23	19:33:43
	(Seconds from Range Zero)	443.348	5692	11292	16893
Semi-major axis	(km)	6564.25	6574.53	6580.69	6587.33
	(nm)	3544.41	3549.96	3553.29	3556.87
Eccentricity		0.000133903	0.000569655	0.000929079	0.0011332309
Inclination	(deg)	31.9824	31.9827	31.9761	31.9863
Right Ascension of Ascending Node	(deg)	6.4472	5.9796	5.4707	4.9475
Argument of Perigee	(deg)	92.2290	108.3521	105.6337	117.1514
True Anomaly	(deg)	-14.5506	-33.3280	-10.1190	-1.5601

NOTE: Mean Sidereal Time 0 Hr. U.T. July 5,1966 = 282.5434038 deg

TABLE VI

ORBITAL PARAMETERS FOR EACH REVOLUTION

Parameters		Revolution 1	Revolution 2	Revolution 3	Revolution 4
EPOCH Time	(sec from Range Zero)	443.348	5692	11292	16893
Space-Fixed Velocity	(m/s)	7793.5	7790.1	7789.9	7787.7
	(ft/s)	25569.88	25558.17	25557.41	25550.10
Azimuth of Space-Fixed Velocity (CW from North)	(deg)	82.4098	80.8334	93.4333	105.0972
Flight Path Angle	(deg)	-0.0019	-0.0179	-0.0093	-0.0018
Altitude from Earth Center	(km)	6563.40	6571.40	6574.67	6579.87
	(nm)	3543.95	3548.27	3550.04	3552.85
Geocentric Latitude	(deg North)	31.1619	30.7753	31.8107	28.5386
Longitude	(deg East)	293.6783	268.2201	268.3092	267.3423
Apogee	(km)	186.6	200.1	208.6	216.6
	(nm)	100.76	108.05	112.63	116.95
Perigee	(km)	185.1	192.6	196.4	201.7
	(nm)	99.95	104.00	106.05	108.91
Period	(min)	88.21	88.39	88.56	88.67

NOTE: Range Zero = 14:53:17 U.T.

Apogee and perigee are defined assuming a spherical earth of radius 6378.165 km (3443.934 nm)

TABLE VII

SOLUTION TRACKING SUMMARY FOR EACH REVOLUTION

Station	Time of Track (Universal Time)	Data Type	Valid Observations	RMS Error of Residuals
Bermuda Island (FPS-16)	15:01:12 15:03:54	AZ EL RA	20 22 21	0.009 deg 0.020 deg 4 m (13 ft)
Carnarvon,Australia (FPQ-6)	15:46:06 15:48:54	AZ EL RA	25 26 26	0.009 deg 0.007 deg 14 m (46 ft)
Woomera,Australia (FPS-16)	15:53:30 15:54:18	AZ EL RA	8 9 9	0.005 deg 0.005 deg 23 m (75 ft)
White Sands, New Mexico (FPS-16)	16:26:54 16:27:48	AZ EL RA	10 9 10	0.015 deg 0.027 deg 6 m (20 ft)
Merritt Island, Florida (TPQ-18)	16:27:48 16:33:18	AZ EL RA	58 57 55	0.011 deg 0.020 deg 17 m (56 ft)

TRACKING USED FOR SOLUTION OF SECOND REVOLUTION INITIAL CONDITIONS

Station	Time of Track (Universal time)	Data Type	Valid Observations	RMS Error of Residuals
Bermuda Island (FPS-16)	16:31:12 16:37:00	AZ EL RA	56 51 59	0.011 deg 0.008 deg 12 m (39 ft)
Carnarvon, Australia (FPQ-6)	17:17:48 17:23:48	AZ EL RA	52 49 55	0.003 deg 0.024 deg 17 m (56 ft)
White Sands,New Mexico (FPS-16)	17:55:48 18:01:42	AZ EL RA	58 49 49	0.025 deg 0.010 deg 35 m (115 ft)
Merritt Island,Florida (TPQ-18)	18:03:12 18:07:18	AZ EL RA	41 35 41	0.009 deg 0.043 deg 25 m (82 ft)

TABLE VII (CONT'D)

Station	Time of Track (Universal Time)	Data Type	Valid Observations	RMS Error of Residuals
Bermuda Island (FPS-16)	18:04:42 18:09:48	AZ EL RA	48 49 47	0.005 deg 0.020 deg 14 m (46 ft)

TRACKING USED FOR SOLUTION OF THIRD REVOLUTION INITIAL CONDITIONS

Station	Time of Track (Universal Time)	Data Type	Valid Observations	RMS Error of Residuals
Bermuda Island (FPS-16)	18:04:42 18:09:48	AZ EL RA	36 37 33	0.015 deg 0.034 deg 5 m (16 ft)
Carnarvon,Australia (FPQ-6)	18:51:06 18:57:48	AZ EL RA	66 51 63	0.010 deg 0.012 deg 16 m (52 ft)
White Sands,New Mexico (FPS-16)	19:29:00 19:34:30	AZ EL RA	50 46 52	0.037 deg 0.021 deg 9 m (30 ft)
Merritt Island, Florida (TPQ-18)	19:36:18 19:40:12	AZ EL RA	40 33 35	0.012 deg 0.013 deg 18 m (59 ft)

TRACKING USED FOR SOLUTION OF FOURTH REVOLUTION INITIAL CONDITIONS

Station	Time of Track (Universal Time)	Data Type	Valid Observations	RMS Error of Residuals
Merritt Island,Florida (TPQ-18)	19:36:18 19:40:12	AZ EL RA	32 38 31	0.006 deg 0.023 deg 15 m (49 ft)
Antigua Island (FPQ-6)	19:39:48 19:42:00	AZ EL RA	22 15 18	0.016 deg 0.009 deg 9 m (30 ft)
Ascension Island (TPQ-18)	19:53:54 19:59:12	AZ EL RA	49 40 46	0.011 deg 0.007 deg 4 m (13 ft)
Hawaii (FPS-16)	20:50:24 20:55:30	AZ EL RA	51 38 43	0.015 deg 0.013 deg 75 m (246 ft)

TABLE VIII
VENTING PROFILE

REVOLUTION 1

Begin Time (sec from Range Zero)	End Time (sec from Range Zero)	Begin Acceleration (m/s^2)	End Acceleration (m/s^2)
444	510	5.72×10^{-3}	4.03×10^{-3}
510	1500	1.24×10^{-3}	1.42×10^{-3}
1500	4250	1.42×10^{-3}	4.70×10^{-4}
4250	5521	4.70×10^{-4}	3.70×10^{-4}
5521	*5893	4.03×10^{-3}	*2.53×10^{-3}

REVOLUTION 2

*5521	5893	*5.942×10^{-3}	3.719×10^{-3}
5893	5905	6.094×10^{-2}	6.094×10^{-2}
5905	6300	1.981×10^{-3}	8.893×10^{-4}
6300	7480	8.893×10^{-4}	4.952×10^{-4}
7480	11237	4.952×10^{-4}	4.952×10^{-4}

REVOLUTION 3

11540	11639	4.225×10^{-3}	3.643×10^{-3}
11639	11663	5.756×10^{-3}	5.756×10^{-3}
11663	12500	1.638×10^{-3}	6.359×10^{-4}
12500	14325	6.359×10^{-4}	5.281×10^{-4}
14325	14480	4.333×10^{-3}	3.546×10^{-3}
14480	*17103	2.695×10^{-4}	*1.617×10^{-4}

REVOLUTION 4

*14480	17103	*2.731×10^{-4}	1.639×10^{-4}
17103	17600	3.911×10^{-3}	2.513×10^{-3}
17600	18520	2.513×10^{-3}	1.551×10^{-3}
18520	20560	1.551×10^{-3}	9.614×10^{-4}
20560	22640	9.614×10^{-4}	7.538×10^{-4}

*Indicate overlapping vents

TABLE IX
ORBITAL TRACKING SUMMARY

*Includes power flight data

	REVOLUTION			
Station	1	2	3	4
Patrick	X*			
MILA	X*	X	X	X
Grand Turk	X*			
Bermuda	X*	X	X	X
Canary Island	X	X		
Carnarvon	X	X	X	
Woomera	X	X		
California	X	X	X	
White Sands	X	X	X	
Eglin AFB	X	X	X	
Hawaii		X	X	X
Antigua			X	X
Ascension			X	X

Revolution 1 began at 15:00:40.348 U.T. (443.348 sec Range Time)

Revolution 2 began at 16:27:08 U.T. (5692 sec Range Time)

Revolution 3 began at 18:00:23 U.T. (11292 sec Range Time)

Revolution 4 began at 19:33:43 U.T. (16893 sec Range Time)

TABLE X
EARTH-FIXED PLUMBLINE PØSITIØNS, VELØCITIES AND ACCELERATIØNS

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ
GUIDANCE REFERENCE RELEASE									
-4.485	0	34	0	0.0	0.0	0.0	0.00	0.00	0.00
-4.0	0	34	0	0.0	0.0	0.0	0.00	0.00	0.00
-3.0	0	34	0	0.0	0.0	0.0	0.00	0.00	0.00
-2.0	0	34	0	0.0	0.0	0.0	0.00	0.00	0.00
-1.0	0	34	0	0.0	0.0	0.0	0.00	0.00	0.00
0.0	0	34	0	0.0	0.0	0.0	0.00	0.00	0.00
FIRST MØTIØN									
0.630	0	34	0	-0.0	0.0	-0.0	-0.19	3.62	0.03
LIFTØFF SIGNAL									
0.860	0	34	0	-0.0	0.8	0.0	-0.15	3.64	0.03
1.0	0	34	0	-0.1	1.3	0.0	-0.12	3.65	0.03
2.0	0	37	0	-0.1	5.0	0.0	-0.00	3.73	0.03
3.0	0	44	0	-0.1	8.8	0.1	0.05	3.81	0.02
4.0	0	55	0	-0.0	12.7	0.1	0.06	3.91	0.02
5.0	0	70	0	0.0	16.6	0.1	0.04	4.00	0.01
6.0	0	88	0	0.1	20.7	0.1	0.01	4.09	0.01
7.0	0	111	0	0.1	24.8	0.1	-0.01	4.19	0.01
8.0	0	138	1	0.0	29.0	0.1	-0.02	4.28	0.02
9.0	0	169	1	0.0	33.4	0.2	-0.01	4.37	0.02
10.0	0	205	1	0.0	37.8	0.2	0.01	4.47	0.03
11.0	0	245	1	0.0	42.3	0.2	0.05	4.56	0.04
12.0	0	289	1	0.1	46.9	0.2	0.12	4.65	0.04
13.0	0	339	1	0.3	51.6	0.3	0.21	4.74	0.06
14.0	0	393	2	0.6	56.4	0.4	0.31	4.84	0.07
15.0	1	452	2	0.9	61.3	0.4	0.43	4.93	0.08
16.0	2	515	2	1.4	66.2	0.5	0.57	5.02	0.09
17.0	3	584	3	2.1	71.3	0.6	0.72	5.11	0.09
18.0	5	658	3	2.9	76.5	0.7	0.87	5.21	0.10
19.0	8	737	4	3.8	81.7	0.8	1.04	5.30	0.10
20.0	12	822	4	4.9	87.1	0.9	1.21	5.39	0.11
21.0	18	912	5	6.2	92.5	1.0	1.38	5.49	0.11
22.0	25	1007	6	7.7	98.1	1.1	1.56	5.58	0.10
23.0	33	1108	7	9.4	103.7	1.2	1.75	5.66	0.10
24.0	43	1215	8	11.2	109.4	1.3	1.94	5.75	0.09

TABLE X
EARTH-FIXED PLUMBLINE PØSITIØNS, VELØCITIES AND ACCELERATIØNS

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ
25.0	55	1327	10	13.3	115.2	1.4	2.13	5.83	0.09
26.0	69	1445	11	15.5	121.1	1.5	2.33	5.92	0.08
27.0	85	1569	12	17.9	127.0	1.6	2.53	5.99	0.08
28.0	104	1700	14	20.5	133.0	1.7	2.73	6.07	0.08
29.0	126	1836	15	23.4	139.2	1.7	2.94	6.15	0.10
30.0	150	1978	17	26.4	145.3	1.8	3.13	6.25	0.14
31.0	178	2127	19	29.7	151.6	2.0	3.32	6.33	0.19
32.0	209	2282	21	33.1	158.0	2.2	3.52	6.41	0.24
33.0	244	2443	23	36.7	164.4	2.4	3.77	6.46	0.20
34.0	282	2611	26	40.6	170.9	2.6	4.02	6.53	0.20
35.0	324	2785	28	44.8	177.5	2.9	4.26	6.63	0.27
36.0	371	2966	31	49.1	184.1	3.2	4.46	6.66	0.29
37.0	422	3154	34	53.7	190.9	3.5	4.69	6.76	0.33
38.0	478	3348	38	58.5	197.6	3.8	4.95	6.78	0.27
39.0	539	3549	42	63.6	204.4	4.0	5.19	6.88	0.25
40.0	605	3757	46	68.9	211.4	4.3	5.51	6.95	0.26
41.0	676	3972	50	74.6	218.3	4.5	5.79	6.94	0.23
42.0	753	4194	55	80.5	225.3	4.8	5.98	7.04	0.22
43.0	836	4423	60	86.6	232.4	5.0	6.19	7.13	0.22
44.0	926	4659	65	92.9	239.5	5.2	6.46	7.13	0.11
45.0	1022	4903	70	99.4	246.7	5.3	6.62	7.20	0.07
46.0	1124	5153	75	106.1	253.9	5.3	6.76	7.22	0.06
47.0	1233	5411	81	112.9	261.1	5.4	6.89	7.22	0.11
48.0	1349	5676	86	119.9	268.4	5.6	7.07	7.20	0.17
49.0	1473	5948	91	127.1	275.5	5.7	7.35	7.02	0.14
50.0	1603	6227	97	134.6	282.4	5.8	7.61	6.77	0.14
51.0	1741	6513	103	142.4	289.0	6.0	7.91	6.50	0.16
MACH ØNE									
51.550	1821	6673	106	146.8	292.5	6.1	8.06	6.41	0.18
52.0	1888	6806	109	150.4	295.4	6.2	8.13	6.32	0.14
53.0	2042	7104	115	158.6	301.7	6.3	8.29	6.28	0.15
54.0	2204	7410	122	167.0	307.9	6.4	8.46	6.21	0.08
55.0	2375	7721	128	175.6	314.2	6.4	8.66	6.34	-0.02
56.0	2555	8038	134	184.3	320.6	6.4	8.85	6.45	-0.13
57.0	2743	8363	141	193.3	327.0	6.3	9.16	6.44	-0.06
58.0	2941	8693	147	202.6	333.5	6.3	9.44	6.46	0.13
59.0	3148	9030	153	212.2	340.0	6.4	9.73	6.48	-0.01
60.0	3365	9374	159	222.0	346.5	6.3	9.92	6.57	-0.11
61.0	3592	9724	166	232.1	353.1	6.1	10.19	6.65	-0.21
62.0	3829	10080	172	242.5	359.7	6.0	10.64	6.61	-0.15
63.0	4077	10444	178	253.3	366.3	6.0	11.04	6.59	0.14

TABLE X
EARTH-FIXED PLUMBLINE PØSITIØNS, VELØCITIES AND ACCELERATIØNS

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ
64.0	4335	10814	184	264.6	372.9	6.2	11.45	6.63	0.27
65.0	4605	11190	190	276.2	379.6	6.4	11.80	6.70	0.29
66.0	4887	11573	196	288.2	386.3	6.7	12.19	6.73	0.12
67.0	5181	11963	203	300.6	393.1	6.8	12.58	6.79	0.04
68.0	5488	12360	210	313.4	399.9	6.9	12.99	6.80	0.35
69.0	5808	12764	217	326.5	406.7	7.4	13.33	6.88	0.73
MAXIMUM DYNAMIC PRESSURE									
70.000	6141	13174	225	340.0	413.6	8.1	13.58	6.97	0.48
71.0	6488	13591	233	353.8	420.6	8.3	13.91	7.05	-0.07
72.0	6848	14016	241	367.7	427.8	8.1	14.08	7.35	-0.30
73.0	7223	14448	249	381.9	435.3	7.7	14.22	7.62	-0.51
74.0	7612	14887	256	396.3	442.9	7.1	14.55	7.74	-0.64
75.0	8015	15334	263	411.1	450.6	6.4	15.19	7.56	-0.64
76.0	8434	15789	269	426.7	458.1	5.9	15.94	7.43	-0.42
77.0	8868	16251	275	442.9	465.4	5.6	16.50	7.27	-0.21
78.0	9319	16720	280	459.6	472.7	5.4	16.86	7.29	-0.17
79.0	9787	17197	286	476.7	480.1	5.4	17.25	7.49	0.07
80.0	10272	17681	291	494.1	487.7	5.4	17.59	7.61	0.05
81.0	10775	18173	296	511.8	495.4	5.4	17.83	7.85	-0.08
82.0	11296	18672	302	529.8	503.3	5.3	18.21	7.94	-0.11
83.0	11835	19180	307	548.2	511.2	5.3	18.68	7.90	-0.03
84.0	12392	19695	312	567.1	519.1	5.3	19.18	7.90	0.09
85.0	12969	20218	318	586.5	527.0	5.3	19.56	7.94	-0.12
86.0	13565	20750	323	606.4	535.0	5.1	2 .12	7.96	-0.29
87.0	14182	21289	328	626.7	543.0	4.7	20.55	8.05	-0.34
88.0	14818	21836	332	647.5	551.0	4.4	20.95	8.04	-0.33
89.0	15476	22391	336	668.6	559.1	4.2	21.39	8.15	-0.17
90.0	16156	22955	341	690.2	567.2	4.1	21.78	8.09	-0.02
91.0	16857	23526	345	712.2	575.4	4.1	22.18	8.25	0.08
92.0	17580	24106	349	734.6	583.7	4.2	22.54	8.46	0.12
93.0	18326	24694	353	757.3	592.2	4.3	22.93	8.46	0.14
94.0	19095	25291	357	780.5	600.7	4.5	23.41	8.59	0.20
95.0	19887	25896	362	804.1	609.3	4.7	23.89	8.53	0.21
96.0	20703	26510	367	828.2	617.9	4.9	24.27	8.53	0.14
97.0	21543	27133	372	852.7	626.4	5.0	24.75	8.55	0.01
98.0	22408	27763	377	877.7	635.0	5.0	25.22	8.61	0.00
99.0	23299	28403	382	903.1	643.6	5.0	25.62	8.65	-0.04
100.0	24215	29051	387	929.0	652.3	4.9	26.18	8.70	-0.12
101.0	25157	29708	391	955.5	661.0	4.8	26.66	8.72	-0.12
102.0	26126	30373	396	982.3	669.7	4.6	27.04	8.73	-0.14
103.0	27122	31048	401	1009.6	678.5	4.5	27.60	8.84	-0.06

TABLE X
EARTH-FIXED PLUMBLINE PØSITIØNS, VELØCITIES AND ACCELERATIØNS

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ
104.0	28145	31731	405	1037.5	687.4	4.5	28.12	8.91	-0.05
105.0	29197	32423	410	1065.8	696.2	4.4	28.53	8.86	-0.10
106.0	30277	33124	414	1094.6	705.1	4.3	29.08	8.90	-0.02
107.0	31386	33834	418	1124.0	714.1	4.4	29.66	9.01	0.08
108.0	32525	34552	423	1153.9	723.1	4.4	30.10	9.02	0.08
109.0	33694	35280	427	1184.2	732.1	4.5	30.61	9.03	0.09
110.0	34894	36017	432	1215.1	741.2	4.6	31.14	9.14	0.13
111.0	36125	36763	437	1246.5	750.4	4.8	31.63	9.19	0.09
112.0	37387	37518	441	1278.4	759.6	4.8	32.23	9.24	0.09
113.0	38682	38283	446	1310.9	768.9	4.9	32.79	9.26	0.03
114.0	40009	39056	451	1344.0	778.1	4.9	33.38	9.30	0.02
115.0	41370	39839	456	1377.7	787.4	5.0	33.99	9.31	0.04
116.0	42765	40632	461	1412.0	796.8	5.0	34.54	9.38	0.04
117.0	44194	41433	466	1446.8	806.1	5.0	35.22	9.38	0.02
118.0	45659	42244	471	1482.3	815.6	5.1	35.77	9.47	0.05
119.0	47159	43065	476	1518.4	825.0	5.1	36.42	9.48	0.05
120.0	48696	43895	482	1555.2	834.5	5.2	37.08	9.53	0.08
121.0	50270	44735	487	1592.6	844.1	5.3	37.76	9.60	0.08
122.0	51882	45584	492	1630.7	853.7	5.3	38.39	9.53	-0.02
123.0	53532	46442	498	1669.4	863.3	5.3	39.05	9.70	0.02
124.0	55221	47311	503	1708.8	873.0	5.3	39.82	9.74	0.01
125.0	56950	48189	508	1749.0	882.7	5.3	40.56	9.69	0.03
126.0	58719	49076	514	1789.9	892.4	5.4	41.31	9.80	0.10
127.0	60530	49974	519	1831.6	902.2	5.5	42.07	9.79	0.10
128.0	62383	50881	525	1874.1	912.1	5.6	42.88	9.85	0.11
129.0	64279	51798	530	1917.4	922.0	5.7	43.68	9.95	0.12
130.0	66218	52726	536	1961.5	931.9	5.8	44.63	9.98	0.09
131.0	68202	53663	542	2006.4	941.9	5.9	45.62	10.00	0.06
132.0	70232	54610	548	2052.2	951.8	6.1	46.62	10.02	0.16
133.0	72308	55567	554	2099.0	961.8	6.2	47.41	10.03	0.15
134.0	74431	56534	560	2146.7	971.8	6.2	48.41	10.10	0.07
135.0	76602	57511	567	2195.3	981.8	6.4	49.20	10.15	0.15
136.0	78822	58497	573	2244.8	991.8	6.6	50.20	10.25	0.13
137.0	81092	59494	580	2295.2	1002.0	6.6	50.99	10.45	0.14
138.0	83413	60502	587	2346.5	1012.8	6.8	51.98	10.70	0.21
139.0	85786	61521	594	2398.6	1024.0	7.0	52.80	11.00	0.17
	INBØARD ENGINE CUTØFF								
139.240	86364	61767	595	2411.3	1026.6	7.0	53.00	11.10	0.17
140.0	88206	62548	601	2438.6	1030.4	7.1	27.45	1.55	0.13
141.0	90659	63580	608	2465.8	1031.9	7.3	26.30	1.10	0.18
142.0	93139	64613	615	2492.0	1033.1	7.5	26.10	1.10	0.17

TABLE X
EARTH-FIXED PLUMBLINE PØSITIØNS, VELØCITIES AND ACCELERATIØNS

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ
ØUTBØARD ENGINE CUTØFF									
142.680	94839	65315	621	2509.9	1033.8	7.6	26.37	1.10	0.17
143.0	95642	65646	623	2514.9	1032.9	7.7	1.72	-8.40	0.12
SEPARATIØN									
143.440	96746	66098	626	2515.7	1029.2	7.7	0.67	-9.02	0.02
144.0	98155	66673	630	2516.0	1024.1	7.8	0.33	-9.10	0.12
145.0	100681	67696	640	2516.3	1015.1	7.9	0.13	-9.10	0.09
150.0	113294	72669	680	2539.0	978.1	7.9	8.76	-5.50	-0.01
155.0	126100	77491	720	2583.7	951.0	8.2	9.16	-5.35	0.13
START IGM									
158.490	135173	80778	749	2615.8	932.5	8.5	9.31	-5.25	0.06
160.0	139133	82180	762	2629.9	924.6	8.6	9.36	-5.28	0.09
165.0	152401	86736	808	2677.6	897.0	10.5	9.79	-5.84	0.60
170.0	165912	91145	868	2727.2	866.1	13.5	10.10	-6.43	0.64
175.0	179675	95396	944	2778.0	833.9	16.8	10.23	-6.45	0.66
180.0	193694	99484	1036	2829.6	801.5	20.2	10.41	-6.54	0.66
185.0	207972	103410	1146	2881.8	768.8	23.6	10.55	-6.55	0.68
190.0	222514	107172	1272	2934.9	736.0	27.1	10.69	-6.61	0.71
195.0	237322	110769	1417	2988.7	702.8	30.8	10.84	-6.63	0.74
200.0	252402	114200	1580	3043.4	669.5	34.5	11.00	-6.75	0.78
205.0	267757	117463	1763	3098.8	635.4	38.6	11.20	-6.89	0.85
210.0	283392	120553	1967	3155.1	600.5	43.0	11.33	-7.05	0.89
215.0	299310	123467	2194	3212.2	565.3	47.7	11.49	-7.04	0.96
220.0	315515	126205	2444	3270.2	529.8	52.4	11.72	-7.10	0.95
225.0	332013	128766	2717	3329.1	494.1	57.2	11.87	-7.18	0.97
230.0	348809	131146	3015	3389.1	458.2	62.0	12.07	-7.21	0.98
235.0	365906	133347	3338	3450.0	421.9	66.9	12.24	-7.28	1.02
240.0	383311	135365	3685	3511.9	385.3	71.9	12.50	-7.33	1.02
245.0	401027	137200	4058	3575.0	348.5	77.1	12.73	-7.40	1.02
250.0	419062	138850	4456	3639.1	311.4	82.2	12.93	-7.42	1.04
255.0	437420	140314	4880	3704.3	274.0	87.4	13.17	-7.50	1.09
260.0	456107	141589	5330	3770.6	236.2	92.8	13.40	-7.57	1.08
265.0	475129	142675	5807	3838.1	198.0	98.2	13.62	-7.64	1.09
270.0	494490	143569	6312	3906.8	159.5	103.7	13.82	-7.75	1.14
275.0	514198	144269	6844	3976.6	120.5	109.3	14.06	-7.83	1.13

TABLE X
EARTH-FIXED PLUMBLINE PØSITIØNS, VELØCITIES AND ACCELERATIØNS

TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S	DDXE M/S SQ	DDYE M/S SQ	DDZE M/S SQ
280.0	534258	144774	7405	4047.5	81.2	115.0	14.29	-7.92	1.15
285.0	554675	145081	7994	4119.6	41.4	120.7	14.56	-8.02	1.14
290.0	575457	145187	8613	4193.0	1.2	126.6	14.82	-8.10	1.18
295.0	596608	145091	9260	4267.8	-39.5	132.6	15.11	-8.17	1.25
300.0	618137	144791	9938	4344.0	-80.8	138.7	15.42	-8.25	1.24
305.0	640051	144283	10647	4421.7	-122.5	144.8	15.66	-8.40	1.22
310.0	662356	143565	11387	4500.8	-164.9	151.1	15.98	-8.53	1.27
315.0	685061	142634	12158	4581.5	-207.8	157.5	16.30	-8.69	1.26
320.0	708174	141486	12962	4663.9	-251.4	163.9	16.65	-8.78	1.30
325.0	731702	140119	13798	4748.0	-295.7	170.5	17.05	-8.91	1.32
330.0	755657	138528	14667	4834.1	-340.6	177.3	17.43	-9.08	1.39
335.0	780047	136711	15571	4922.2	-386.3	184.2	17.81	-9.20	1.37
340.0	804882	134664	16510	5012.2	-432.8	191.3	18.18	-9.46	1.37
345.0	830172	132382	17484	5104.3	-480.2	198.5	18.67	-9.54	1.44
350.0	855929	129861	18495	5198.6	-528.4	205.8	19.10	-9.69	1.52
355.0	882163	127097	19543	5295.3	-577.5	213.3	19.57	-9.95	1.59
360.0	908886	124085	20629	5394.3	-627.6	221.0	20.02	-10.11	1.56
365.0	936110	120820	21753	5495.6	-678.6	228.8	20.48	-10.36	1.54
370.0	963846	117296	22917	5599.3	-730.9	236.7	20.98	-10.61	1.59
375.0	992107	113509	24121	5705.7	-784.3	244.8	21.55	-10.86	1.63
380.0	1020908	109452	25365	5815.0	-838.9	253.2	22.12	-11.03	1.70
385.0	1050262	105118	26653	5927.2	-894.7	261.7	22.75	-11.27	1.70
390.0	1080186	100502	27983	6042.8	-951.9	270.3	23.47	-11.58	1.76
395.0	1110695	95597	29356	6161.6	-1010.6	279.2	24.09	-11.94	1.78
400.0	1141808	90394	30775	6283.9	-1071.0	288.4	24.88	-12.22	1.90
405.0	1173541	84884	32240	6409.7	-1133.1	297.8	25.42	-12.57	1.93
410.0	1205914	79059	33754	6540.2	-1197.5	307.5	26.40	-13.21	1.96
415.0	1238949	72904	35316	6674.3	-1265.0	317.6	27.30	-13.72	2.02
420.0	1272665	66407	36930	6813.1	-1334.0	327.9	28.26	-13.85	2.08
425.0	1307089	59563	38597	6957.2	-1404.3	338.7	29.24	-14.75	2.17
430.0	1342244	52354	40318	7106.0	-1480.1	349.7	30.45	-15.40	2.19
S-IVB CUTØFF SIGNAL									
433.348	1366201	47314	41500	7209.2	-1531.5	356.6	31.41	-15.40	1.69
435.0	1378125	44770	42091	7215.0	-1546.6	358.2	-1.50	-8.23	0.52
440.0	1414179	36935	43889	7206.1	-1587.3	360.7	-1.81	-8.12	0.56
ØRBITAL INSERTIØN									
443.348	1438295	31576	45099	7200.1	-1614.5	362.4	-1.84	-8.13	0.49

TABLE XI
SPACE-FIXED EPHEMERIS PØSITIØNS, VELØCITIES AND ACCELERATIØNS

TIME SEC	XSP KM	YSP KM	ZSP KM	DXSP M/S	DYSP M/S	DZSP M/S	DDXSP M/S SQ	DDYSP M/S SQ	DDZSP M/S SQ
GUIDANCE REFERENCE RELEASE									
-4.485	2290.566	5118.731	3028.451	-373.3	167.0	0.0	0.02	0.02	0.0
-4.0	2290.385	5118.812	3028.451	-373.3	167.0	0.0	0.02	0.02	0.0
-3.0	2290.012	5118.979	3028.451	-373.3	167.0	0.0	0.02	0.02	0.0
-2.0	2289.639	5119.146	3028.451	-373.3	167.0	0.0	0.02	0.02	0.0
-1.0	2289.266	5119.313	3028.451	-373.3	166.9	0.0	0.02	0.02	0.0
0.0	2288.892	5119.479	3028.451	-373.3	166.9	0.0	0.02	0.02	0.0
FIRST MØTIØN									
0.630	2288.657	5119.585	3028.451	-373.3	166.9	0.0	1.49	2.89	1.65
LIFTØFF SIGNAL									
0.860	2288.571	5119.623	3028.451	-373.0	167.5	0.4	1.46	2.91	1.67
1.0	2288.519	5119.647	3028.451	-372.8	168.0	0.6	1.44	2.93	1.69
2.0	2288.147	5119.816	3028.453	-371.4	170.9	2.3	1.36	3.02	1.78
3.0	2287.776	5119.988	3028.456	-370.1	173.9	4.1	1.34	3.11	1.82
4.0	2287.406	5120.164	3028.461	-368.8	177.0	6.0	1.37	3.18	1.87
5.0	2287.038	5120.343	3028.468	-367.5	180.2	7.9	1.41	3.25	1.91
6.0	2286.672	5120.524	3028.477	-366.1	183.4	9.8	1.47	3.32	1.95
7.0	2286.306	5120.709	3028.487	-364.6	186.7	11.8	1.52	3.39	1.99
8.0	2285.942	5120.898	3028.500	-363.1	190.1	13.8	1.57	3.46	2.03
9.0	2285.580	5121.089	3028.515	-361.5	193.5	15.8	1.60	3.54	2.07
10.0	2285.220	5121.285	3028.532	-360.0	197.1	17.9	1.61	3.62	2.11
11.0	2284.860	5121.484	3028.551	-358.4	200.7	20.0	1.59	3.71	2.16
12.0	2284.503	5121.686	3028.572	-356.8	204.4	22.2	1.56	3.81	2.22
13.0	2284.147	5121.892	3028.595	-355.3	208.2	24.5	1.51	3.91	2.28
14.0	2283.793	5122.102	3028.621	-353.9	212.1	26.8	1.45	4.02	2.34
15.0	2283.439	5122.317	3028.649	-352.5	216.1	29.2	1.37	4.13	2.41
16.0	2283.088	5122.534	3028.680	-351.2	220.3	31.6	1.27	4.24	2.48
17.0	2282.738	5122.757	3028.712	-350.0	224.5	34.1	1.17	4.36	2.56
18.0	2282.388	5122.984	3028.748	-349.0	228.9	36.7	1.05	4.48	2.64
19.0	2282.041	5123.214	3028.786	-348.0	233.4	39.4	0.93	4.60	2.73
20.0	2281.693	5123.450	3028.827	-347.2	238.0	42.2	0.81	4.72	2.82
21.0	2281.346	5123.691	3028.871	-346.5	242.7	45.0	0.67	4.83	2.91
22.0	2281.000	5123.936	3028.917	-345.9	247.6	48.0	0.54	4.95	3.00
23.0	2280.655	5124.186	3028.967	-345.5	252.5	51.0	0.40	5.06	3.10
24.0	2280.310	5124.441	3029.020	-345.2	257.6	54.2	0.25	5.18	3.20

TABLE XI
SPACE-FIXED EPHEMERIS PØSITIØNS, VELØCITIES AND ACCELERATIØNS

TIME SEC	XSP KM	YSP KM	ZSP KM	DXSP M/S	DYSP M/S	DZSP M/S	DDXSP M/S SQ	DDYSP M/S SQ	DDZSP M/S SQ
25.0	2279.965	5124.701	3029.076	-345.0	262.8	57.4	0.10	5.29	3.79
26.0	2279.621	5124.966	3029.135	-345.0	268.1	60.8	-0.05	5.40	3.89
27.0	2279.276	5125.237	3029.197	-345.2	273.5	64.2	-0.21	5.52	3.98
28.0	2278.931	5125.513	3029.263	-345.5	279.0	67.7	-0.37	5.63	3.57
29.0	2278.585	5125.795	3029.333	-346.0	284.7	71.4	-0.54	5.75	3.65
30.0	2278.240	5126.082	3029.406	-346.7	290.4	75.1	-0.69	5.90	3.72
31.0	2277.893	5126.376	3029.483	-347.5	296.3	78.8	-0.84	6.04	3.77
32.0	2277.545	5126.675	3029.564	-348.4	302.4	82.6	-1.01	6.18	3.81
33.0	2277.197	5126.981	3029.649	-349.6	308.6	86.5	-1.22	6.26	3.94
34.0	2276.847	5127.292	3029.737	-350.9	314.9	90.5	-1.42	6.39	4. 4
35.0	2276.495	5127.611	3029.830	-352.5	321.3	94.5	-1.62	6.56	4.1
36.0	2276.142	5127.935	3029.926	-354.2	327.9	98.6	-1.80	6.65	4.15
37.0	2275.787	5128.266	3030.027	-356.2	334.6	102.8	-1.99	6.80	4.23
38.0	2275.430	5128.604	3030.132	-358.3	341.3	107.1	-2.21	6.86	4.36
39.0	2275.071	5128.949	3030.241	-360.6	348.2	111.5	-2.40	6.99	4.48
40.0	2274.710	5129.301	3030.355	-363.2	355.2	116.1	-2.68	7.13	4.60
41.0	2274.346	5129.660	3030.474	-366.0	362.3	120.7	-2.94	7.17	4.70
42.0	2273.978	5130.026	3030.597	-369.1	369.5	125.5	-3.09	7.29	4.8
43.0	2273.608	5130.399	3030.725	-372.3	376.8	130.3	-3.24	7.42	4.90
44.0	2273.234	5130.779	3030.858	-375.7	384.2	135.3	-3.49	7.42	5. 6
45.0	2272.857	5131.167	3030.996	-379.3	391.6	140.4	-3.61	7.50	5.17
46.0	2272.476	5131.563	3031.139	-383.0	399.1	145.6	-3.73	7.54	5.3
47.0	2272.092	5131.966	3031.287	-386.8	406.6	150.9	-3.86	7.60	5.23
48.0	2271.704	5132.376	3031.440	-390.8	414.2	156.1	-4.04	7.66	5.22
49.0	2271.311	5132.794	3031.599	-395.0	421.8	161.3	-4.36	7.57	5. 3
50.0	2270.914	5133.220	3031.763	-399.6	429.2	166.5	-4.70	7.44	5. 8
51.0	2270.513	5133.653	3031.932	-404.5	436.6	171.7	-5.07	7.30	5.12
MACH ØNE									
51.550	2270.289	5133.894	3032.028	-407.4	440.6	174.5	-5.25	7.28	5.1
52.0	2270.106	5134.093	3032.107	-409.8	443.8	176.8	-5.34	7.20	5.1
53.0	2269.694	5134.540	3032.286	-415.2	450.9	181.9	-5.51	7.21	5.13
54.0	2269.276	5134.995	3032.471	-420.9	458.1	187.1	-5.68	7.16	5.19
55.0	2268.853	5135.457	3032.661	-426.6	465.2	192.4	-5.81	7.25	5.39
56.0	2268.423	5135.926	3032.856	-432.6	472.5	197.9	-5.95	7.34	5.39
57.0	2267.988	5136.402	3033.056	-438.7	479.8	203.5	-6.25	7.44	5.61
58.0	2267.547	5136.886	3033.263	-445.1	487.3	209.0	-6.52	7.63	5.54
59.0	2267.098	5137.377	3033.475	-451.8	494.9	214.7	-6.77	7.64	5.74
60.0	2266.644	5137.876	3033.692	-458.7	502.5	220.5	-6.90	7.71	5.92
61.0	2266.182	5138.382	3033.916	-465.7	510.2	226.5	-7.12	7.78	6.12
62.0	2265.713	5138.897	3034.146	-473.1	518.0	232.7	-7.56	7.89	6.17
63.0	2265.236	5139.419	3034.382	-480.9	525.9	238.8	-7.97	8.13	6. 4

TABLE XI
SPACE-FIXED EPHEMERIS PØSITIØNS, VELØCITIES AND ACCELERATIØNS

TIME SEC	XSP KM	YSP KM	ZSP KM	DXSP M/S	DYSP M/S	DZSP M/S	DDXSP M/S SQ	DDYSP M/S SQ	DDZSP M/S SQ
64.0	2264.752	5139.949	3034.623	-489.1	534.1	244.8	-8.35	8.33	6. 6
65.0	2264.259	5140.487	3034.871	-497.6	542.5	250.9	-8.65	8.49	6.16
66.0	2263.757	5141.034	3035.126	-506.5	550.9	257.2	-8.99	8.51	6.43
67.0	2263.246	5141.589	3035.386	-515.7	559.5	263.7	-9.33	8.61	6.62
68.0	2262.726	5142.153	3035.653	-525.2	568.1	270.3	-9.73	8.88	6.48
69.0	2262.196	5142.726	3035.927	-535.1	577.1	276.7	-10.06	9.24	6.29
MAXIMUM DYNAMIC PRESSURE									
70.000	2261.656	5143.308	3036.207	-545.4	586.3	283.1	-10.24	9.23	6.61
71.0	2261.106	5143.899	3036.493	-555.8	595.5	290.0	-10.47	9.08	7.20
72.0	2260.545	5144.499	3036.787	-566.3	604.6	297.4	-10.50	9.24	7.58
73.0	2259.974	5145.108	3037.088	-576.8	613.8	305.2	-10.52	9.37	7.93
74.0	2259.392	5145.727	3037.398	-587.5	623.1	313.2	-10.77	9.48	8.18
75.0	2258.799	5146.355	3037.715	-598.6	632.6	321.5	-11.43	9.49	8.37
76.0	2258.195	5146.993	3038.041	-610.4	642.2	329.7	-12.20	9.69	8.22
77.0	2257.579	5147.639	3038.375	-623.0	651.8	337.9	-12.80	9.82	8.15
78.0	2256.950	5148.296	3038.717	-636.0	661.6	346.1	-13.13	9.93	8.20
79.0	2256.307	5148.963	3039.067	-649.3	671.7	354.2	-13.45	10.32	8.20
80.0	2255.651	5149.640	3039.426	-662.9	682.1	362.5	-13.72	10.49	8.37
81.0	2254.982	5150.328	3039.793	-676.8	692.6	371.0	-13.85	10.66	8.66
82.0	2254.298	5151.026	3040.168	-690.8	703.3	379.8	-14.17	10.81	8.82
83.0	2253.600	5151.735	3040.552	-705.2	714.1	388.6	-14.63	10.93	8.87
84.0	2252.888	5152.454	3040.945	-720.1	725.1	397.5	-15.11	11.12	8.90
85.0	2252.161	5153.185	3041.348	-735.4	736.2	406.6	-15.43	11.14	9.23
86.0	2251.417	5153.927	3041.759	-751.2	747.3	415.9	-15.94	11.20	9.51
87.0	2250.658	5154.680	3042.180	-767.3	758.5	425.5	-16.29	11.34	9.71
88.0	2249.883	5155.445	3042.610	-783.8	769.9	435.3	-16.68	11.44	9.80
89.0	2249.091	5156.221	3043.051	-800.7	781.4	445.1	-17.06	11.71	9.84
90.0	2248.282	5157.008	3043.501	-818.0	793.1	454.9	-17.46	11.84	9.79
91.0	2247.456	5157.807	3043.961	-835.7	805.1	464.8	-17.80	12.12	9.89
92.0	2246.611	5158.618	3044.430	-853.7	817.3	474.7	-18.07	12.39	10. 6
93.0	2245.748	5159.442	3044.910	-871.9	829.7	484.9	-18.43	12.49	10.15
94.0	2244.867	5160.278	3045.400	-890.6	842.2	495.1	-18.84	12.75	10.29
95.0	2243.967	5161.127	3045.901	-909.7	855.0	505.4	-19.31	12.82	10.39
96.0	2243.048	5161.989	3046.411	-929.2	867.8	515.9	-19.66	12.87	10.54
97.0	2242.108	5162.863	3046.933	-949.2	880.7	526.5	-20.09	12.94	10.79
98.0	2241.150	5163.750	3047.465	-969.5	893.6	537.4	-20.50	13.09	10.96
99.0	2240.170	5164.651	3048.008	-990.2	906.7	548.4	-20.87	13.19	11.12
100.0	2239.169	5165.564	3048.562	-1011.4	919.9	559.7	-21.36	13.32	11.30
101.0	2238.147	5166.491	3049.127	-1033.0	933.2	571.1	-21.80	13.45	11.50
102.0	2237.103	5167.431	3049.704	-1055.0	946.7	582.7	-22.15	13.54	11.63
103.0	2236.037	5168.385	3050.293	-1077.5	960.3	594.4	-22.65	13.80	11.76

TABLE XI
SPACE-FIXED EPHEMERIS PØSITIØNS, VELØCITIES AND ACCELERATIØNS

TIME SEC	XSP KM	YSP KM	ZSP KM	DXSP M/S	DYSP M/S	DZSP M/S	DDXSP M/S SQ	DDYSP M/S SQ	DDZSP M/S SQ
104.0	2234.948	5169.352	3050.893	-1100.4	974.2	606.2	-23.11	13.99	11.93
105.0	2233.837	5170.333	3051.506	-1123.7	988.1	618.2	-23.51	14.02	12.06
106.0	2232.701	5171.328	3052.130	-1147.5	1002.2	630.3	-24.02	14.22	12.17
107.0	2231.541	5172.338	3052.767	-1171.8	1016.5	642.6	-24.53	14.50	12.29
108.0	2230.357	5173.362	3053.416	-1196.6	1031.0	654.9	-24.94	14.61	12.41
109.0	2229.148	5174.400	3054.077	-1221.8	1045.6	667.4	-25.41	14.74	12.55
110.0	2227.913	5175.454	3054.751	-1247.5	1060.5	680.0	-25.88	14.98	12.71
111.0	2226.653	5176.522	3055.437	-1273.6	1075.5	692.9	-26.31	15.11	12.90
112.0	2225.366	5177.605	3056.137	-1300.2	1090.6	705.9	-26.86	15.30	13. 9
113.0	2224.053	5178.703	3056.849	-1327.4	1105.9	719.0	-27.37	15.41	13.30
114.0	2222.711	5179.817	3057.575	-1355.1	1121.4	732.4	-27.91	15.58	13.46
115.0	2221.343	5180.946	3058.314	-1383.3	1137.0	746.0	-28.48	15.74	13.64
116.0	2219.945	5182.092	3059.067	-1412.1	1152.8	759.7	-28.97	15.92	13.82
117.0	2218.518	5183.253	3059.834	-1441.4	1168.7	773.6	-29.60	16.07	14. 3
118.0	2217.062	5184.429	3060.615	-1471.2	1184.9	787.7	-30.09	16.29	14.19
119.0	2215.575	5185.623	3061.410	-1501.7	1201.2	802.0	-30.69	16.45	14.37
120.0	2214.058	5186.832	3062.219	-1532.7	1217.7	816.5	-31.30	16.66	14.55
121.0	2212.510	5188.059	3063.043	-1564.3	1234.4	831.1	-31.91	16.88	14.77
122.0	2210.930	5189.301	3063.882	-1596.6	1251.2	846.0	-32.52	16.92	14.99
123.0	2209.316	5190.561	3064.735	-1629.4	1268.3	861.1	-33.08	17.23	15.22
124.0	2207.670	5191.839	3065.604	-1662.9	1285.5	876.5	-33.78	17.44	15.45
125.0	2205.991	5193.133	3066.489	-1697.0	1303.0	892.0	-34.49	17.58	15.62
126.0	2204.276	5194.445	3067.388	-1731.9	1320.7	907.7	-35.17	17.88	15.81
127.0	2202.526	5195.775	3068.304	-1767.4	1338.6	923.6	-35.88	18.06	16.02
128.0	2200.740	5197.123	3069.236	-1803.7	1356.7	939.8	-36.62	18.30	16.25
129.0	2198.919	5198.489	3070.184	-1840.7	1375.1	956.1	-37.33	18.57	16.52
130.0	2197.059	5199.873	3071.149	-1878.5	1393.8	972.8	-38.21	18.81	16.81
131.0	2195.161	5201.277	3072.130	-1917.0	1412.6	989.7	-39.12	19.04	17.11
132.0	2193.225	5202.699	3073.128	-1956.4	1431.6	1006.7	-40.06	19.35	17.31
133.0	2191.248	5204.140	3074.144	-1996.7	1450.9	1024.1	-40.80	19.53	17.54
134.0	2189.230	5205.601	3075.177	-2037.7	1470.3	1041.7	-41.70	19.78	17.91
135.0	2187.171	5207.082	3076.227	-2079.7	1490.1	1059.6	-42.43	20.05	18.08
136.0	2185.070	5208.582	3077.296	-2122.5	1510.1	1077.7	-43.33	20.36	18.41
137.0	2182.926	5210.102	3078.383	-2166.0	1530.3	1096.2	-44.00	20.70	18.72
138.0	2180.737	5211.643	3079.489	-2210.3	1551.3	1115.1	-44.84	21.17	19.05
139.0	2178.504	5213.206	3080.614	-2255.1	1572.9	1134.4	-45.50	21.58	19.45
	INBØARD ENGINE CUTØFF								
139.240	2177.962	5213.584	3080.887	-2266.0	1578.1	1139.1	-45.66	21.71	19.55
140.0	2176.231	5214.786	3081.756	-2290.3	1587.6	1148.3	-25.21	7.76	8.08
141.0	2173.927	5216.378	3082.908	-2315.4	1595.2	1156.3	-24.31	7.13	7.52
142.0	2171.599	5217.978	3084.069	-2339.6	1602.4	1163.7	-24.12	7.07	7.47

TABLE XI

SPACE-FIXED EPHEMERIS PØSITIØNS, VELØCITIES AND ACCELERATIØNS

TIME SEC	XSP KM	YSP KM	ZSP KM	DXSP M/S	DYSP M/S	DZSP M/S	DDXSP M/S SQ	DDYSP M/S SQ	DDZSP M/S SQ
ØUTBØARD ENGINE CUTØFF									
142.680	2170.003	5219.069	3084.862	-2356.1	1607.2	1168.8	-24.37	7.14	7.54
143.0	2169.249	5219.583	3085.235	-2361.2	1607.6	1169.7	-4.75	-6.55	-3.65
SEPARATIØN									
143.440	2168.212	5220.287	3085.749	-2363.4	1604.6	1168.1	-3.97	-7.36	-4.14
144.0	2166.888	5221.185	3086.402	-2365.6	1600.5	1165.8	-3.69	-7.45	-4.36
145.0	2164.512	5222.788	3087.568	-2369.2	1593.0	1161.4	-3.50	-7.52	-4.39
150.0	2152.598	5230.674	3093.335	-2404.4	1567.1	1149.9	-10.26	-2.58	-0.24
155.0	2140.446	5238.478	3099.081	-2456.6	1554.7	1148.8	-10.60	-2.30	-0.18
START IGM									
158.490	2131.808	5243.890	3103.090	-2493.7	1546.6	1148.5	-10.70	-2.22	-0.03
160.0	2128.030	5246.223	3104.824	-2510.0	1543.2	1148.4	-10.76	-2.22	-0.06
165.0	2115.344	5253.910	3110.564	-2565.3	1531.8	1146.6	-11.40	-2.32	-0.64
170.0	2102.373	5261.538	3116.288	-2623.7	1518.8	1142.8	-11.89	-2.71	-0.86
175.0	2089.104	5269.098	3121.991	-2683.6	1505.1	1138.4	-12.02	-2.69	-0.85
180.0	2075.535	5276.589	3127.672	-2744.3	1491.3	1134.2	-12.21	-2.73	-0.85
185.0	2061.660	5284.011	3133.333	-2805.8	1477.5	1129.9	-12.35	-2.71	-0.84
190.0	2047.476	5291.364	3138.972	-2868.0	1463.8	1125.7	-12.50	-2.73	-0.85
195.0	2032.979	5298.649	3144.589	-2931.1	1450.0	1121.4	-12.65	-2.70	-0.85
200.0	2018.165	5305.864	3150.186	-2994.9	1436.2	1117.2	-12.84	-2.74	-0.89
205.0	2003.028	5313.010	3155.760	-3059.9	1422.1	1112.5	-13.08	-2.78	-0.96
210.0	1987.564	5320.084	3161.310	-3125.9	1407.7	1107.5	-13.26	-2.88	-1.03
215.0	1971.768	5327.087	3166.835	-3192.8	1393.2	1102.3	-13.41	-2.82	-1.04
220.0	1955.635	5334.017	3172.333	-3260.6	1378.7	1097.1	-13.64	-2.83	-1.00
225.0	1939.161	5340.875	3177.806	-3329.3	1364.3	1092.1	-13.81	-2.86	-1.01
230.0	1922.340	5347.660	3183.254	-3399.1	1349.8	1087.1	-14.01	-2.84	-0.98
235.0	1905.168	5354.373	3188.678	-3469.9	1335.3	1082.2	-14.19	-2.86	-1.01
240.0	1887.640	5361.013	3194.076	-3541.6	1320.7	1077.4	-14.44	-2.85	-0.96
245.0	1869.750	5367.580	3199.452	-3614.6	1306.2	1072.7	-14.68	-2.87	-0.93
250.0	1851.492	5374.075	3204.803	-3688.6	1291.6	1068.0	-14.87	-2.84	-0.90
255.0	1832.862	5380.496	3210.132	-3763.8	1277.0	1063.5	-15.13	-2.84	-0.92
260.0	1813.853	5386.844	3215.438	-3840.1	1262.3	1059.0	-15.37	-2.86	-0.88
265.0	1794.460	5393.119	3220.722	-3917.6	1247.6	1054.6	-15.59	-2.88	-0.86
270.0	1774.675	5399.320	3225.984	-3996.3	1232.8	1050.2	-15.82	-2.91	-0.90
275.0	1754.494	5405.448	3231.224	-4076.3	1217.9	1045.9	-16.06	-2.94	-0.87

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SPACE-FIXED EPHEMERIS PØSITIØNS, VELØCITIES AND ACCELERATIØNS

TIME SEC	XSP KM	YSP KM	ZSP KM	DXSP M/S	DYSP M/S	DZSP M/S	DDXSP M/S SQ	DDYSP M/S SQ	DDZSP M/S SQ
280.0	1733.910	5411.499	3236.443	-4157.4	1202.9	1041.6	-16.31	-2.97	-0.86
285.0	1712.918	5417.477	3241.640	-4239.8	1187.8	1037.3	-16.59	-3.00	-0.83
290.0	1691.511	5423.377	3246.816	-4323.5	1172.6	1033.1	-16.86	-3.00	-0.83
295.0	1669.681	5429.202	3251.971	-4408.7	1157.3	1029.0	-17.16	-2.98	-0.85
300.0	1647.421	5434.950	3257.106	-4495.3	1141.8	1024.9	-17.48	-2.99	-0.79
305.0	1624.725	5440.620	3262.221	-4583.6	1126.3	1020.9	-17.75	-3.09	-0.78
310.0	1601.584	5446.212	3267.315	-4673.3	1110.5	1016.9	-18.09	-3.11	-0.80
315.0	1577.989	5451.726	3272.390	-4764.7	1094.6	1013.0	-18.44	-3.20	-0.78
320.0	1553.934	5457.158	3277.445	-4858.0	1078.5	1009.1	-18.80	-3.18	-0.76
325.0	1529.407	5462.511	3282.481	-4953.0	1062.2	1005.3	-19.22	-3.21	-0.73
330.0	1504.400	5467.781	3287.499	-5050.2	1045.9	1001.6	-19.63	-3.24	-0.77
335.0	1478.901	5472.969	3292.497	-5149.5	1029.3	997.9	-20.02	-3.28	-0.70
340.0	1452.901	5478.074	3297.477	-5250.8	1012.5	994.2	-20.46	-3.43	-0.73
345.0	1426.389	5483.095	3302.439	-5354.4	995.5	990.6	-20.95	-3.37	-0.69
350.0	1399.353	5488.029	3307.383	-5460.4	978.2	987.0	-21.40	-3.37	-0.72
355.0	1371.781	5492.877	3312.309	-5568.8	960.8	983.5	-21.92	-3.51	-0.69
360.0	1343.661	5497.636	3317.218	-5679.8	943.0	980.1	-22.41	-3.53	-0.70
365.0	1314.979	5502.306	3322.110	-5793.2	924.9	976.7	-22.92	-3.66	-0.68
370.0	1285.724	5506.885	3326.985	-5909.3	906.3	973.2	-23.47	-3.74	-0.70
375.0	1255.882	5511.369	3331.843	-6028.3	887.5	969.9	-24.09	-3.82	-0.70
380.0	1225.436	5515.759	3336.683	-6150.3	868.2	966.5	-24.68	-3.82	-0.69
385.0	1194.373	5520.051	3341.507	-6275.6	848.7	963.2	-25.35	-3.90	-0.63
390.0	1162.674	5524.245	3346.315	-6404.4	828.6	960.0	-26.13	-3.98	-0.63
395.0	1130.322	5528.336	3351.108	-6536.9	808.1	956.8	-26.83	-4.16	-0.65
400.0	1097.299	5532.324	3355.883	-6673.1	787.1	953.5	-27.67	-4.16	-0.67
405.0	1063.585	5536.206	3360.643	-6813.2	765.3	950.1	-28.29	-4.34	-0.71
410.0	1029.157	5539.977	3365.385	-6958.4	742.8	946.6	-29.42	-4.65	-0.78
415.0	993.993	5543.631	3370.107	-7108.1	718.6	942.4	-30.43	-4.86	-0.83
420.0	958.068	5547.163	3374.810	-7262.7	694.3	938.5	-31.38	-4.76	-0.69
425.0	921.356	5550.576	3379.494	-7422.7	670.1	935.0	-32.60	-5.25	-0.92
430.0	883.831	5553.857	3384.156	-7588.9	642.5	930.1	-33.95	-5.54	-0.92
S-IVB CUTØFF SIGNAL									
433.348	858.238	5555.977	3387.265	-7703.7	623.9	927.8	-34.78	-5.66	-0.17
435.0	845.493	5556.999	3388.793	-7714.6	612.0	920.7	-1.46	-7.79	-4.77
440.0	806.905	5559.961	3393.337	-7720.5	572.8	896.8	-1.13	-7.75	-4.83
ØRBITAL INSERTIØN									
443.348	781.050	5561.835	3396.313	-7724.3	546.6	880.8	-1.09	-7.80	-4.79

TABLE XII
GEØGRAPHIC CØØRDINATES

TIME SEC	EC DIST KM	LØNG DEG	GC LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
	GUIDANCE REFERENCE RELEASE										
-4.485	6373.352	-80.5650	28.3707	0.00	90.00	0.0	90.00	-0.00	408.9	0	34
-4.0	6373.352	-80.5650	28.3707	0.00	90.00	0.0	90.00	-0.00	408.9	0	34
-3.0	6373.352	-80.5650	28.3707	0.00	90.00	0.0	90.00	-0.00	408.9	0	34
-2.0	6373.352	-80.5650	28.3707	0.00	90.00	0.0	90.00	-0.00	408.9	0	34
-1.0	6373.352	-80.5650	28.3707	0.00	90.00	0.0	90.00	-0.00	408.9	0	34
0.0	6373.352	-80.5650	28.3707	0.00	90.00	0.0	90.00	-0.00	408.9	0	34
	FIRST MØTIØN										
0.630	6373.352	-80.5650	28.3707	0.00	90.00	0.0	90.00	0.00	408.9	0	34
	LIFTØFF SIGNAL										
0.860	6373.352	-80.5650	28.3707	245.98	87.40	0.8	90.00	0.12	408.9	0	34
1.0	6373.352	-80.5650	28.3707	245.46	87.61	1.3	90.00	0.19	408.9	0	34
2.0	6373.355	-80.5650	28.3707	239.81	88.75	5.0	90.01	0.70	408.9	0	37
3.0	6373.362	-80.5650	28.3707	225.86	89.45	8.8	90.01	1.23	409.0	0	44
4.0	6373.373	-80.5650	28.3707	181.30	89.77	12.7	90.01	1.77	409.1	0	55
5.0	6373.388	-80.5650	28.3707	127.10	89.78	16.6	90.01	2.33	409.3	0	70
6.0	6373.406	-80.5650	28.3707	111.25	89.76	20.7	90.00	2.89	409.5	1	88
7.0	6373.429	-80.5650	28.3707	109.51	89.78	24.8	90.00	3.47	409.8	1	111
8.0	6373.456	-80.5650	28.3707	115.32	89.83	29.0	90.01	4.06	410.0	1	138
9.0	6373.487	-80.5649	28.3707	125.52	89.86	33.4	90.01	4.66	410.4	1	169
10.0	6373.523	-80.5649	28.3707	130.03	89.86	37.8	90.01	5.28	410.8	1	205
11.0	6373.563	-80.5649	28.3707	121.25	89.83	42.3	90.01	5.90	411.2	1	245
12.0	6373.607	-80.5649	28.3707	107.47	89.74	46.9	90.01	6.54	411.8	1	289
13.0	6373.657	-80.5649	28.3707	97.28	89.58	51.6	90.01	7.19	412.6	2	339
14.0	6373.711	-80.5649	28.3707	91.08	89.35	56.4	90.00	7.84	413.5	2	393
15.0	6373.770	-80.5649	28.3707	87.25	89.05	61.3	89.99	8.50	414.5	2	452
16.0	6373.833	-80.5649	28.3707	84.73	88.68	66.3	89.98	9.17	415.8	3	515
17.0	6373.902	-80.5649	28.3707	82.95	88.25	71.4	89.96	9.84	417.3	4	584
18.0	6373.976	-80.5649	28.3707	81.62	87.77	76.5	89.94	10.52	419.0	6	658
19.0	6374.055	-80.5649	28.3707	80.56	87.24	81.8	89.91	11.20	420.9	9	737
20.0	6374.140	-80.5648	28.3707	79.68	86.67	87.2	89.87	11.88	423.0	13	822
21.0	6374.230	-80.5648	28.3707	78.94	86.06	92.7	89.83	12.56	425.4	19	912
22.0	6374.325	-80.5647	28.3707	78.28	85.42	98.4	89.78	13.24	428.1	25	1007
23.0	6374.426	-80.5646	28.3707	77.70	84.76	104.1	89.72	13.92	431.0	34	1108
24.0	6374.533	-80.5645	28.3707	77.17	84.07	110.0	89.66	14.59	434.1	44	1215

TABLE XII
GEØGRAPHIC CØØRDINATES

TIME SEC	EC DIST KM	LØNG DEG	GC LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
25.0	6374.645	-80.5644	28.3707	76.70	83.37	115.9	89.58	15.26	437.5	56	1327
26.0	6374.763	-80.5642	28.3708	76.28	82.64	122.0	89.50	15.93	441.1	70	1445
27.0	6374.887	-80.5641	28.3708	75.91	81.91	128.3	89.41	16.58	445.1	86	1569
28.0	6375.018	-80.5639	28.3708	75.59	81.16	134.6	89.31	17.22	449.3	105	1700
29.0	6375.154	-80.5637	28.3709	75.34	80.40	141.1	89.21	17.86	453.7	127	1836
30.0	6375.296	-80.5634	28.3709	75.11	79.62	147.7	89.10	18.48	458.5	151	1978
31.0	6375.445	-80.5632	28.3710	75.04	78.87	154.5	88.99	19.09	463.4	179	2127
32.0	6375.599	-80.5629	28.3711	75.10	78.11	161.4	88.89	19.69	468.7	210	2282
33.0	6375.761	-80.5625	28.3712	75.09	77.34	168.5	88.78	20.28	474.3	245	2443
34.0	6375.928	-80.5621	28.3712	75.06	76.57	175.7	88.66	20.85	480.1	283	2611
35.0	6376.103	-80.5617	28.3713	75.05	75.78	183.1	88.53	21.40	486.2	326	2785
36.0	6376.284	-80.5612	28.3714	75.10	75.00	190.6	88.41	21.94	492.7	372	2966
37.0	6376.471	-80.5607	28.3716	75.15	74.22	198.3	88.28	22.47	499.4	423	3154
38.0	6376.666	-80.5602	28.3717	75.16	73.44	206.1	88.15	22.97	506.3	479	3348
39.0	6376.867	-80.5596	28.3718	75.13	72.66	214.1	88.01	23.45	513.6	540	3549
40.0	6377.075	-80.5589	28.3720	75.09	71.87	222.4	87.86	23.92	521.1	606	3757
41.0	6377.290	-80.5582	28.3721	75.03	71.07	230.7	87.70	24.37	529.0	677	3972
42.0	6377.512	-80.5575	28.3723	74.96	70.28	239.3	87.54	24.79	537.1	755	4194
43.0	6377.741	-80.5566	28.3725	74.89	69.51	248.0	87.37	25.21	545.5	838	4424
44.0	6377.977	-80.5558	28.3727	74.79	68.74	257.0	87.20	25.60	554.2	927	4660
45.0	6378.220	-80.5548	28.3729	74.65	67.99	266.0	87.01	25.98	563.0	1023	4903
46.0	6378.471	-80.5538	28.3732	74.51	67.26	275.2	86.82	26.35	572.0	1126	5154
47.0	6378.728	-80.5527	28.3734	74.39	66.55	284.6	86.64	26.69	581.1	1235	5411
48.0	6378.993	-80.5516	28.3737	74.31	65.86	294.0	86.46	27.02	590.5	1351	5676
49.0	6379.265	-80.5504	28.3740	74.24	65.17	303.4	86.28	27.32	600.0	1474	5948
50.0	6379.544	-80.5491	28.3743	74.17	64.46	312.9	86.09	27.58	609.6	1605	6228
51.0	6379.830	-80.5477	28.3746	74.10	63.72	322.2	85.91	27.80	619.4	1743	6514
	MACH ØNE										
51.550	6379.990	-80.5469	28.3748	74.07	63.31	327.4	85.81	27.91	624.9	1822	6674
52.0	6380.123	-80.5463	28.3750	74.05	62.97	331.6	85.73	27.99	629.4	1889	6806
53.0	6380.421	-80.5448	28.3754	73.99	62.22	340.9	85.54	28.15	639.4	2043	7105
54.0	6380.726	-80.5432	28.3758	73.92	61.48	350.4	85.35	28.29	649.6	2205	7410
55.0	6381.038	-80.5415	28.3762	73.83	60.77	360.0	85.16	28.43	659.9	2376	7721
56.0	6381.355	-80.5397	28.3766	73.72	60.07	369.9	84.96	28.56	670.4	2555	8039
57.0	6381.679	-80.5379	28.3771	73.61	59.38	380.0	84.76	28.68	681.2	2743	8363
58.0	6382.010	-80.5359	28.3776	73.55	58.69	390.3	84.57	28.79	692.3	2941	8694
59.0	6382.346	-80.5339	28.3781	73.49	58.00	400.8	84.38	28.88	703.6	3148	9031
60.0	6382.690	-80.5318	28.3786	73.41	57.32	411.6	84.18	28.97	715.2	3364	9375
61.0	6383.040	-80.5296	28.3792	73.30	56.66	422.6	83.97	29.05	727.0	3590	9725
62.0	6383.397	-80.5273	28.3798	73.21	56.00	433.9	83.77	29.12	739.1	3827	10082
63.0	6383.760	-80.5248	28.3805	73.14	55.31	445.4	83.57	29.17	751.6	4074	10445

TABLE XII
GEØGRAPHIC CØØRDINATES

TIME SEC	EC DIST KM	LØNG DEG	GC LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
64.0	6384.130	-80.5223	28.3811	73.14	54.63	457.3	83.39	29.20	764.5	4332	10815
65.0	6384.506	-80.5197	28.3818	73.15	53.95	469.5	83.22	29.21	777.7	4601	11192
66.0	6384.889	-80.5169	28.3825	73.14	53.27	482.0	83.05	29.22	791.3	4882	11575
67.0	6385.279	-80.5141	28.3833	73.11	52.59	494.9	82.86	29.22	805.3	5176	11966
68.0	6385.676	-80.5111	28.3841	73.09	51.91	508.1	82.68	29.20	819.6	5482	12363
69.0	6386.080	-80.5079	28.3849	73.14	51.24	521.6	82.53	29.18	834.3	5800	12766
	MAXIMUM DYNAMIC PRESSURE										
70.000	6386.490	-80.5047	28.3858	73.20	50.58	535.4	82.39	29.15	849.3	6132	13177
71.0	6386.908	-80.5013	28.3867	73.19	49.94	549.7	82.22	29.11	864.6	6478	13595
72.0	6387.332	-80.4978	28.3876	73.12	49.33	564.2	82.02	29.09	880.1	6837	14020
73.0	6387.764	-80.4941	28.3886	73.01	48.75	579.1	81.81	29.08	895.8	7211	14452
74.0	6388.203	-80.4903	28.3896	72.89	48.20	594.4	81.59	29.07	911.9	7598	14892
75.0	6388.651	-80.4864	28.3906	72.76	47.64	610.0	81.37	29.05	928.3	8000	15339
76.0	6389.106	-80.4823	28.3917	72.67	47.06	626.1	81.16	29.00	945.3	8417	15794
77.0	6389.568	-80.4781	28.3929	72.60	46.45	642.5	80.96	28.92	962.9	8850	16257
78.0	6390.037	-80.4737	28.3941	72.56	45.84	659.3	80.78	28.83	980.8	9299	16727
79.0	6390.514	-80.4692	28.3953	72.54	45.24	676.6	80.61	28.74	999.2	9765	17204
80.0	6390.999	-80.4645	28.3966	72.52	44.67	694.2	80.45	28.65	1017.9	10248	17689
81.0	6391.491	-80.4596	28.3980	72.51	44.11	712.3	80.28	28.56	1037.0	10749	18182
82.0	6391.991	-80.4545	28.3993	72.48	43.58	730.7	80.12	28.48	1056.4	11267	18682
83.0	6392.499	-80.4493	28.4008	72.46	43.06	749.6	79.96	28.39	1076.3	11803	19191
84.0	6393.015	-80.4439	28.4023	72.45	42.53	768.9	79.81	28.29	1096.5	12358	19707
85.0	6393.539	-80.4383	28.4038	72.44	42.01	788.5	79.66	28.19	1117.2	12932	20232
86.0	6394.071	-80.4325	28.4054	72.41	41.49	808.6	79.50	28.08	1138.3	13525	20764
87.0	6394.611	-80.4265	28.4071	72.36	40.98	829.2	79.33	27.96	1159.8	14138	21305
88.0	6395.159	-80.4204	28.4088	72.33	40.48	850.2	79.17	27.84	1181.8	14772	21853
89.0	6395.716	-80.4140	28.4106	72.30	39.99	871.6	79.02	27.72	1204.1	15426	22410
90.0	6396.280	-80.4074	28.4124	72.28	39.51	893.4	78.88	27.60	1226.8	16101	22975
91.0	6396.853	-80.4006	28.4143	72.28	39.04	915.6	78.75	27.47	1250.0	16798	23549
92.0	6397.434	-80.3936	28.4163	72.29	38.58	938.3	78.62	27.35	1273.6	17517	24130
93.0	6398.024	-80.3864	28.4183	72.29	38.14	961.4	78.50	27.23	1297.6	18259	24721
94.0	6398.622	-80.3789	28.4203	72.30	37.71	984.9	78.39	27.11	1322.0	19022	25320
95.0	6399.229	-80.3713	28.4225	72.31	37.28	1008.9	78.27	26.98	1346.9	19810	25927
96.0	6399.845	-80.3634	28.4247	72.32	36.86	1033.3	78.16	26.85	1372.1	20620	26544
97.0	6400.469	-80.3552	28.4269	72.32	36.44	1058.1	78.05	26.72	1397.8	21455	27169
98.0	6401.102	-80.3468	28.4293	72.32	36.03	1083.3	77.94	26.59	1423.8	22314	27803
99.0	6401.744	-80.3382	28.4317	72.31	35.63	1109.0	77.82	26.45	1450.3	23199	28446
100.0	6402.395	-80.3294	28.4341	72.30	35.24	1135.2	77.71	26.32	1477.3	24108	29097
101.0	6403.055	-80.3203	28.4367	72.29	34.85	1161.8	77.60	26.18	1504.7	25043	29757
102.0	6403.723	-80.3109	28.4393	72.29	34.47	1188.9	77.49	26.04	1532.6	26005	30427
103.0	6404.401	-80.3012	28.4420	72.28	34.09	1216.4	77.39	25.90	1560.9	26993	31105

TABLE XII
GEØGRAPHIC CØØRDINATES

TIME SEC	EC DIST KM	LØNG DEG	GC LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
104.0	6405.087	-80.2914	28.4448	72.27	33.73	1244.5	77.28	25.76	1589.8	28009	31793
105.0	6405.783	-80.2812	28.4476	72.27	33.37	1273.1	77.19	25.62	1619.0	29052	32490
106.0	6406.488	-80.2707	28.4505	72.27	33.01	1302.1	77.09	25.48	1648.8	30123	33195
107.0	6407.202	-80.2600	28.4535	72.27	32.66	1331.7	77.00	25.34	1679.1	31223	33911
108.0	6407.926	-80.2490	28.4566	72.27	32.31	1361.7	76.91	25.20	1709.9	32352	34635
109.0	6408.659	-80.2377	28.4597	72.28	31.98	1392.3	76.83	25.05	1741.2	33511	35369
110.0	6409.401	-80.2261	28.4630	72.29	31.65	1423.3	76.74	24.91	1772.9	34700	36112
111.0	6410.153	-80.2143	28.4663	72.29	31.32	1454.9	76.66	24.77	1805.2	35920	36865
112.0	6410.914	-80.2021	28.4697	72.30	31.00	1487.1	76.59	24.63	1838.0	37171	37627
113.0	6411.685	-80.1896	28.4732	72.30	30.69	1519.8	76.51	24.49	1871.4	38453	38400
114.0	6412.466	-80.1767	28.4768	72.31	30.38	1553.0	76.43	24.34	1905.3	39768	39181
115.0	6413.256	-80.1636	28.4804	72.31	30.07	1586.9	76.36	24.20	1939.8	41115	39973
116.0	6414.056	-80.1501	28.4842	72.31	29.77	1621.3	76.28	24.06	1974.8	42496	40774
117.0	6414.867	-80.1363	28.4880	72.32	29.47	1656.3	76.21	23.91	2010.5	43911	41586
118.0	6415.687	-80.1222	28.4920	72.32	29.18	1691.9	76.14	23.77	2046.7	45360	42407
119.0	6416.517	-80.1077	28.4960	72.33	28.89	1728.1	76.08	23.62	2083.5	46845	43238
120.0	6417.357	-80.0929	28.5001	72.33	28.60	1764.9	76.01	23.48	2121.0	48365	44080
121.0	6418.207	-80.0777	28.5043	72.34	28.32	1802.5	75.95	23.33	2159.1	49921	44931
122.0	6419.068	-80.0622	28.5087	72.34	28.05	1840.6	75.88	23.19	2197.8	51515	45793
123.0	6419.938	-80.0463	28.5131	72.35	27.77	1879.4	75.82	23.04	2237.2	53146	46665
124.0	6420.820	-80.0300	28.5176	72.35	27.50	1918.9	75.76	22.90	2277.3	54815	47548
125.0	6421.711	-80.0133	28.5223	72.36	27.24	1959.1	75.70	22.76	2318.1	56524	48441
126.0	6422.613	-79.9963	28.5270	72.37	26.98	2000.1	75.65	22.61	2359.6	58272	49345
127.0	6423.526	-79.9788	28.5319	72.37	26.72	2041.8	75.59	22.47	2401.8	60060	50259
128.0	6424.450	-79.9610	28.5368	72.38	26.46	2084.2	75.54	22.32	2444.9	61890	51184
129.0	6425.384	-79.9427	28.5419	72.39	26.20	2127.5	75.49	22.18	2488.7	63761	52120
130.0	6426.329	-79.9240	28.5471	72.40	25.95	2171.6	75.44	22.03	2533.3	65675	53067
131.0	6427.285	-79.9049	28.5524	72.41	25.71	2216.5	75.39	21.89	2578.7	67633	54024
132.0	6428.252	-79.8854	28.5578	72.42	25.46	2262.2	75.34	21.74	2625.0	69635	54993
133.0	6429.230	-79.8654	28.5633	72.43	25.21	2308.9	75.30	21.60	2672.2	71682	55973
134.0	6430.220	-79.8450	28.5690	72.44	24.97	2356.4	75.25	21.45	2720.2	73776	56964
135.0	6431.220	-79.8241	28.5747	72.45	24.73	2404.8	75.21	21.30	2769.1	75916	57967
136.0	6432.232	-79.8027	28.5807	72.46	24.49	2454.1	75.17	21.16	2819.0	78104	58980
137.0	6433.255	-79.7809	28.5867	72.47	24.26	2504.4	75.13	21.01	2869.7	80341	60005
138.0	6434.290	-79.7585	28.5928	72.48	24.04	2555.7	75.09	20.88	2921.5	82627	61043
139.0	6435.338	-79.7357	28.5991	72.50	23.83	2608.0	75.05	20.75	2974.3	84964	62092
	INBØARD ENGINE CUTØFF										
139.240	6435.591	-79.7302	28.6007	72.50	23.78	2620.7	75.04	20.72	2987.1	85533	62346
140.0	6436.396	-79.7124	28.6056	72.51	23.64	2647.3	75.02	20.62	3014.0	87346	63152
141.0	6437.459	-79.6888	28.6121	72.52	23.47	2673.1	75.01	20.50	3040.2	89761	64218
142.0	6438.526	-79.6650	28.6186	72.54	23.30	2697.7	75.00	20.37	3065.2	92201	65286

TABLE XII
GEØGRAPHIC CØØRDINATES

TIME SEC	EC DIST KM	LØNG DEG	GC LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
	ØUTBØARD ENGINE CUTØFF										
142.680	6439.252	-79.6486	28.6231	72.55	23.18	2714.5	75.00	20.28	3082.3	93874	66013
143.0	6439.593	-79.6409	28.6252	72.55	23.13	2718.8	75.00	20.24	3086.7	94663	66356
	SEPARATIØN										
143.440	6440.061	-79.6303	28.6282	72.56	23.06	2718.1	75.00	20.18	3086.2	95749	66825
144.0	6440.656	-79.6168	28.6319	72.57	22.97	2716.5	75.01	20.10	3084.9	97134	67421
145.0	6441.716	-79.5925	28.6385	72.58	22.82	2713.3	75.02	19.96	3082.1	99618	68483
150.0	6446.887	-79.4713	28.6717	72.64	22.03	2720.9	75.06	19.27	3091.8	112009	73664
155.0	6451.935	-79.3483	28.7052	72.71	21.28	2753.1	75.08	18.64	3126.0	124573	78723
	START IGM										
158.490	6455.397	-79.2613	28.7289	72.75	20.77	2777.1	75.10	18.21	3151.1	133465	82192
160.0	6456.880	-79.2233	28.7392	72.77	20.56	2787.7	75.10	18.03	3162.3	137345	83678
165.0	6461.723	-79.0960	28.7735	72.87	19.82	2823.8	75.16	17.41	3200.3	150331	88532
170.0	6466.452	-78.9664	28.8083	73.00	19.04	2861.5	75.23	16.75	3239.8	163542	93272
175.0	6471.057	-78.8344	28.8434	73.13	18.25	2900.5	75.31	16.07	3280.7	176985	97888
180.0	6475.536	-78.6999	28.8788	73.26	17.48	2940.9	75.39	15.42	3322.9	190666	102379
185.0	6479.891	-78.5629	28.9146	73.39	16.73	2982.7	75.47	14.78	3366.3	204588	106745
190.0	6484.122	-78.4234	28.9508	73.52	16.00	3025.9	75.55	14.15	3411.0	218755	110987
195.0	6488.230	-78.2813	28.9873	73.65	15.28	3070.4	75.64	13.54	3457.0	233173	115107
200.0	6492.215	-78.1365	29.0242	73.79	14.59	3116.3	75.72	12.94	3504.3	247844	119104
205.0	6496.077	-77.9890	29.0615	73.92	13.90	3163.5	75.82	12.35	3552.9	262774	122978
210.0	6499.815	-77.8387	29.0990	74.07	13.23	3212.1	75.91	11.77	3602.7	277967	126728
215.0	6503.427	-77.6856	29.1369	74.21	12.57	3261.9	76.01	11.20	3653.7	293429	130352
220.0	6506.915	-77.5296	29.1752	74.36	11.93	3313.3	76.12	10.65	3706.2	309163	133852
225.0	6510.280	-77.3708	29.2137	74.50	11.32	3366.1	76.22	10.12	3760.1	325175	137229
230.0	6513.522	-77.2089	29.2526	74.65	10.72	3420.5	76.32	9.60	3815.4	341470	140484
235.0	6516.643	-77.0440	29.2918	74.80	10.14	3476.4	76.43	9.10	3872.2	358054	143618
240.0	6519.645	-76.8760	29.3313	74.94	9.58	3533.7	76.53	8.61	3930.4	374933	146632
245.0	6522.528	-76.7048	29.3712	75.09	9.05	3592.8	76.64	8.14	3990.2	392111	149528
250.0	6525.294	-76.5303	29.4114	75.24	8.53	3653.3	76.74	7.68	4051.5	409597	152307
255.0	6527.945	-76.3526	29.4519	75.38	8.03	3715.5	76.85	7.24	4114.3	427394	154971
260.0	6530.482	-76.1714	29.4927	75.53	7.54	3779.1	76.96	6.82	4178.6	445511	157521
265.0	6532.907	-75.9869	29.5339	75.68	7.08	3844.5	77.07	6.41	4244.5	463952	159959
270.0	6535.220	-75.7988	29.5754	75.83	6.63	3911.4	77.18	6.01	4312.0	482725	162286
275.0	6537.425	-75.6071	29.6172	75.98	6.20	3979.9	77.30	5.63	4381.0	501837	164503

TABLE XII
GEØGRAPHIC CØØRDINATES

TIME SEC	EC DIST KM	LØNG DEG	GC LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL M/S	HEAD DEG	FLT-PATH DEG	SF VEL M/S	RANGE M	ALTITUDE M
280.0	6539.521	-75.4117	29.6593	76.13	5.79	4049.9	77.41	5.27	4451.5	521293	166613
285.0	6541.511	-75.2126	29.7017	76.28	5.39	4121.6	77.53	4.91	4523.6	541100	168617
290.0	6543.397	-75.0097	29.7444	76.43	5.02	4194.9	77.65	4.58	4597.3	561265	170517
295.0	6545.180	-74.8029	29.7874	76.59	4.66	4270.0	77.77	4.25	4672.7	581797	172314
300.0	6546.863	-74.5921	29.8307	76.74	4.31	4347.0	77.89	3.94	4750.0	602702	174011
305.0	6548.447	-74.3772	29.8743	76.90	3.98	4425.8	78.01	3.65	4829.0	623989	175609
310.0	6549.935	-74.1582	29.9182	77.05	3.66	4506.3	78.14	3.36	4909.9	645665	177111
315.0	6551.328	-73.9348	29.9624	77.21	3.36	4588.9	78.26	3.09	4992.7	667741	178518
320.0	6552.628	-73.7071	30.0068	77.37	3.08	4673.5	78.39	2.83	5077.5	690224	179833
325.0	6553.838	-73.4750	30.0516	77.53	2.81	4760.2	78.52	2.59	5164.4	713125	181057
330.0	6554.960	-73.2382	30.0965	77.69	2.55	4849.3	78.65	2.35	5253.7	736453	182193
335.0	6555.996	-72.9967	30.1418	77.86	2.31	4940.7	78.79	2.13	5345.3	760221	183244
340.0	6556.949	-72.7504	30.1872	78.02	2.08	5034.4	78.93	1.92	5439.2	784438	184212
345.0	6557.821	-72.4991	30.2329	78.19	1.86	5130.7	79.07	1.72	5535.5	809117	185099
350.0	6558.615	-72.2427	30.2789	78.36	1.66	5229.5	79.21	1.54	5634.4	834269	185908
355.0	6559.335	-71.9811	30.3250	78.53	1.47	5331.0	79.35	1.36	5736.0	859906	186643
360.0	6559.982	-71.7141	30.3714	78.71	1.29	5435.2	79.50	1.20	5840.3	886042	187306
365.0	6560.561	-71.4416	30.4179	78.88	1.13	5542.0	79.65	1.05	5947.3	912690	187900
370.0	6561.074	-71.1634	30.4646	79.06	0.98	5651.8	79.80	0.91	6057.1	939863	188428
375.0	6561.525	-70.8794	30.5115	79.24	0.84	5764.6	79.95	0.78	6169.9	967575	188894
380.0	6561.916	-70.5894	30.5586	79.42	0.71	5880.6	80.11	0.66	6286.1	995842	189301
385.0	6562.253	-70.2932	30.6058	79.61	0.59	6000.1	80.27	0.56	6405.6	1024679	189653
390.0	6562.539	-69.9907	30.6531	79.79	0.49	6123.2	80.43	0.46	6528.8	1054104	189954
395.0	6562.778	-69.6815	30.7005	79.98	0.40	6250.2	80.60	0.37	6655.7	1084136	190209
400.0	6562.974	-69.3656	30.7479	80.18	0.32	6381.0	80.77	0.30	6786.6	1114792	190421
405.0	6563.132	-69.0427	30.7955	80.38	0.25	6515.9	80.94	0.23	6921.6	1146094	190595
410.0	6563.255	-68.7126	30.8430	80.58	0.18	6656.0	81.12	0.17	7061.6	1178061	190734
415.0	6563.344	-68.3750	30.8906	80.78	0.12	6800.5	81.30	0.11	7206.2	1210719	190836
420.0	6563.403	-68.0296	30.9381	80.99	0.08	6950.2	81.49	0.07	7356.0	1244090	190912
425.0	6563.442	-67.6762	30.9856	81.20	0.05	7105.5	81.68	0.05	7511.3	1278201	190967
430.0	6563.460	-67.3145	31.0330	81.42	0.01	7266.9	81.87	0.01	7672.6	1313080	191001
	S-IVB CUTØFF SIGNAL										
433.348	6563.461	-67.0675	31.0647	81.56	-0.00	7378.7	82.00	-0.00	7784.4	1336874	191012
435.0	6563.461	-66.9444	31.0802	81.63	-0.00	7387.6	82.07	-0.00	7793.4	1348723	191017
440.0	6563.460	-66.5717	31.1266	81.85	-0.00	7387.7	82.27	-0.00	7793.5	1384584	191031
	ØRBITAL INSERTIØN										
443.348	6563.458	-66.3219	31.1569	81.99	-0.00	7387.8	82.41	-0.00	7793.6	1408596	191040

TABLE XIII
EARTH-FIXED PLUMBLINE PØSITIØNS, VELØCITIES AND ACCELERATIØNS

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ
GUIDANCE REFERENCE RELEASE									
-4.485	0	111	0	0.0	0.0	0.0	0.00	0.00	0.00
-4.0	0	111	0	0.0	0.0	0.0	0.00	0.00	0.00
-3.0	0	111	0	0.0	0.0	0.0	0.00	0.00	0.00
-2.0	0	111	0	0.0	0.0	0.0	0.00	0.00	0.00
-1.0	0	111	0	0.0	0.0	0.0	0.00	0.00	0.00
0.0	0	111	0	0.0	0.0	0.0	0.00	0.00	0.00
FIRST MØTIØN									
0.630	0	111	0	-0.0	0.0	-0.0	-0.62	11.87	0.09
LIFTØFF SIGNAL									
0.860	0	111	0	-0.1	2.7	0.0	-0.48	11.93	0.09
1.0	0	112	0	-0.2	4.4	0.0	-0.40	11.96	0.09
2.0	0	122	0	-0.4	16.5	0.1	-0.01	12.23	0.08
3.0	-0	145	0	-0.3	28.9	0.2	0.16	12.52	0.07
4.0	-0	180	0	-0.1	41.5	0.3	0.19	12.82	0.06
5.0	-0	228	1	0.1	54.5	0.3	0.13	13.12	0.05
6.0	-0	289	1	0.2	67.8	0.4	0.05	13.43	0.04
7.0	-0	364	2	0.2	81.4	0.4	-0.03	13.74	0.04
8.0	0	452	2	0.1	95.3	0.5	-0.06	14.05	0.05
9.0	0	555	2	0.1	109.5	0.5	-0.05	14.35	0.07
10.0	0	671	3	0.0	124.0	0.6	0.03	14.66	0.09
11.0	0	803	4	0.1	138.8	0.7	0.18	14.96	0.11
12.0	0	949	4	0.4	153.9	0.8	0.40	15.26	0.15
13.0	0	1111	5	1.0	169.3	1.0	0.68	15.56	0.18
14.0	0	1288	5	1.8	185.0	1.2	1.03	15.87	0.22
15.0	2	1481	6	3.0	201.0	1.4	1.43	16.17	0.25
16.0	5	1691	7	4.7	217.4	1.7	1.87	16.48	0.28
17.0	10	1917	9	6.8	234.0	2.0	2.35	16.78	0.31
18.0	17	2159	10	9.4	250.9	2.3	2.87	17.09	0.33
19.0	27	2419	12	12.5	268.2	2.6	3.41	17.39	0.34
20.0	41	2696	15	16.2	285.7	3.0	3.97	17.70	0.35
21.0	58	2991	17	20.5	303.6	3.3	4.54	18.00	0.35
22.0	80	3304	20	25.3	321.7	3.7	5.13	18.30	0.34
23.0	107	3635	24	30.8	340.1	4.0	5.74	18.59	0.32
24.0	140	3985	27	36.8	358.9	4.3	6.36	18.87	0.30

TABLE XIII

EARTH-FIXED PLUMBLINE PØSITIØNS, VELØCITIES AND ACCELERATIØNS

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ
25.0	180	4354	31	43.5	377.9	4.6	6.99	19.14	0.28
26.0	226	4742	36	50.8	397.2	4.9	7.63	19.41	0.27
27.0	279	5149	40	58.7	416.7	5.2	8.29	19.67	0.26
28.0	342	5576	45	67.4	436.5	5.4	8.96	19.92	0.28
29.0	413	6023	50	76.7	456.5	5.7	9.64	20.17	0.32
30.0	493	6490	56	86.8	476.8	6.0	10.27	20.51	0.46
31.0	584	6977	61	97.3	497.3	6.5	10.89	20.76	0.62
32.0	686	7485	68	108.6	518.3	7.3	11.55	21.02	0.79
33.0	800	8015	76	120.5	539.4	8.0	12.36	21.19	0.66
34.0	926	8565	84	133.2	560.7	8.7	13.19	21.43	0.66
35.0	1065	9137	93	146.9	582.3	9.4	13.99	21.75	0.88
36.0	1218	9731	102	161.2	604.1	10.4	14.63	21.86	0.95
37.0	1385	10346	113	176.1	626.2	11.4	15.39	22.16	1.08
38.0	1568	10984	125	191.9	648.3	12.4	16.24	22.26	0.87
39.0	1767	11644	137	208.6	670.8	13.2	17.03	22.57	0.83
40.0	1984	12327	151	226.1	693.5	14.1	18.09	22.81	0.85
41.0	2218	13032	165	244.7	716.3	14.9	19.00	22.78	0.75
42.0	2471	13761	180	264.0	739.2	15.6	19.63	23.08	0.73
43.0	2744	14512	196	284.0	762.4	16.4	20.31	23.40	0.74
44.0	3038	15287	213	304.8	785.8	17.0	21.20	23.38	0.37
45.0	3352	16085	230	326.2	809.3	17.3	21.72	23.62	0.24
46.0	3688	16907	247	348.2	833.0	17.5	22.17	23.68	0.19
47.0	4046	17753	264	370.6	856.7	17.8	22.61	23.70	0.36
48.0	4427	18622	282	393.5	880.4	18.2	23.20	23.64	0.55
49.0	4832	19515	300	417.1	903.7	18.7	24.11	23.03	0.46
50.0	5260	20431	319	441.6	926.4	19.2	24.97	22.22	0.47
51.0	5713	21369	338	467.1	948.2	19.7	25.94	21.33	0.53
MACH ØNE									
51.550	5974	21894	349	481.5	959.8	20.0	26.44	21.04	0.60
52.0	6193	22328	358	493.5	969.2	20.2	26.68	20.73	0.47
53.0	6699	23309	378	520.4	989.8	20.7	27.20	20.60	0.49
54.0	7232	24310	399	547.9	1010.3	21.0	27.75	20.38	0.27
55.0	7793	25331	420	576.0	1030.8	21.1	28.40	20.79	-0.06
56.0	8382	26373	441	604.7	1051.8	20.9	29.04	21.16	-0.42
57.0	9001	27436	461	634.3	1073.0	20.6	30.05	21.11	-0.19
58.0	9649	28521	482	664.8	1094.1	20.7	30.99	21.21	0.44
59.0	10329	29626	502	696.3	1115.3	20.9	31.92	21.27	-0.02
60.0	11040	30753	523	728.5	1136.8	20.8	32.53	21.57	-0.36
61.0	11784	31902	543	761.4	1158.5	20.2	33.44	21.81	-0.69
62.0	12562	33072	563	795.6	1180.3	19.7	34.91	21.68	-0.50
63.0	13374	34264	583	831.2	1201.8	19.6	36.23	21.64	0.44

TABLE XIII

EARTH-FIXED PLUMBLINE PØSITIØNS, VELØCITIES AND ACCELERATIØNS

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ
64.0	14283	35477	602	868.1	1223.6	20.3	37.57	21.76	0.87
65.0	15109	36713	623	906.2	1245.4	21.1	38.71	21.99	0.95
66.0	16034	37970	644	945.6	1267.5	21.9	39.99	22.08	0.39
67.0	16999	39250	666	986.2	1289.6	22.2	41.28	22.27	0.14
68.0	18006	40551	688	1028.2	1311.9	22.7	42.60	22.30	1.14
69.0	19055	41875	712	1071.3	1334.2	24.4	43.72	22.58	2.41
MAXIMUM DYNAMIC PRESSURE									
70.000	20147	43222	737	1115.4	1356.9	26.5	44.55	22.86	1.58
71.0	21285	44591	764	1160.6	1379.9	27.3	45.64	23.13	-0.23
72.0	22467	45983	791	1206.5	1403.6	26.7	46.18	24.11	-0.98
73.0	23696	47400	817	1252.9	1428.1	25.2	46.66	24.99	-1.69
74.0	24972	48842	841	1300.1	1453.2	23.2	47.72	25.39	-2.11
75.0	26296	50308	863	1348.9	1478.3	21.1	49.85	24.80	-2.11
76.0	27669	51800	883	1399.8	1503.1	19.5	52.29	24.37	-1.37
77.0	29095	53316	902	1453.1	1527.1	18.4	54.15	23.86	-0.68
78.0	30575	54856	920	1507.9	1550.9	17.7	55.31	23.91	-0.55
79.0	32110	56420	937	1563.8	1575.2	17.6	56.58	24.56	0.22
80.0	33702	58008	955	1620.9	1600.0	17.8	57.71	24.97	0.17
81.0	35352	59621	973	1679.1	1625.2	17.8	58.51	25.75	-0.28
82.0	37060	61261	990	1738.1	1651.2	17.4	59.73	26.05	-0.35
83.0	38828	62926	1008	1798.6	1677.2	17.2	61.27	25.91	-0.10
84.0	40657	64617	1025	1860.7	1703.2	17.3	62.92	25.91	0.30
85.0	42549	66334	1042	1924.3	1729.0	17.3	64.17	26.07	-0.38
86.0	44505	68077	1059	1989.4	1755.1	16.6	66.03	26.13	-0.94
87.0	46527	69846	1075	2056.0	1781.4	15.5	67.41	26.40	-1.12
88.0	48617	71641	1090	2124.2	1807.8	14.4	68.74	26.39	-1.07
89.0	50775	73463	1104	2193.6	1834.4	13.6	70.17	26.74	-0.56
90.0	53004	75311	1117	2264.5	1860.9	13.3	71.44	26.55	-0.06
91.0	55304	77187	1131	2336.6	1887.8	13.5	72.78	27.07	0.28
92.0	57677	79089	1144	2410.0	1915.2	13.8	73.96	27.75	0.38
93.0	60124	81019	1158	2484.5	1943.0	14.2	75.23	27.75	0.45
94.0	62646	82976	1172	2560.6	1970.9	14.8	76.81	28.19	0.67
95.0	65246	84962	1188	2638.2	1999.0	15.5	78.38	27.99	0.68
96.0	67923	86976	1203	2717.2	2027.1	16.1	79.62	27.97	0.48
97.0	70680	89017	1220	2797.6	2055.1	16.3	81.22	28.06	0.05
98.0	73518	91087	1236	2879.6	2083.2	16.4	82.73	28.25	0.01
99.0	76440	93185	1252	2963.0	2111.5	16.3	84.07	28.36	-0.14
100.0	79445	95312	1268	3048.0	2140.0	16.0	85.88	28.53	-0.40
101.0	82536	97467	1284	3134.7	2168.5	15.7	87.46	28.62	-0.39
102.0	85715	99650	1300	3222.8	2197.1	15.2	88.70	28.65	-0.46
103.0	88982	101863	1315	3312.5	2226.0	14.9	90.55	29.01	-0.19

TABLE XIII

EARTH-FIXED PLUMBLINE PØSITIØNS, VELØCITIES AND ACCELERATIØNS

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ
104.0	92340	104104	1330	3403.9	2255.1	14.7	92.25	29.23	-0.16
105.0	95790	106374	1344	3496.8	2284.2	14.5	93.61	29.08	-0.33
106.0	99334	108674	1358	3591.2	2313.4	14.2	95.42	29.19	-0.08
107.0	102973	111003	1373	3687.7	2342.7	14.3	97.30	29.57	0.25
108.0	106710	113361	1387	3785.7	2372.3	14.6	98.75	29.59	0.26
109.0	110545	115749	1402	3885.3	2402.0	14.9	100.41	29.63	0.29
110.0	114481	118166	1417	3986.6	2431.8	15.2	102.17	29.99	0.42
111.0	118519	120614	1433	4089.5	2461.9	15.6	103.76	30.16	0.28
112.0	122661	123092	1448	4194.3	2492.1	15.9	105.75	30.31	0.29
113.0	126909	125600	1464	4301.0	2522.5	16.1	107.59	30.39	0.10
114.0	131264	128138	1481	4409.5	2552.9	16.2	109.53	30.50	0.08
115.0	135729	130707	1497	4520.0	2583.5	16.3	111.53	30.54	0.14
116.0	140305	133306	1513	4632.5	2614.1	16.4	113.31	30.77	0.14
117.0	144995	135936	1530	4746.9	2644.8	16.5	115.54	30.76	0.05
118.0	149800	138597	1546	4863.3	2675.8	16.7	117.36	31.06	0.17
119.0	154722	141289	1563	4981.7	2706.8	16.8	119.48	31.09	0.16
120.0	159764	144012	1580	5102.3	2738.0	17.0	121.65	31.26	0.27
121.0	164928	146767	1597	5225.0	2769.3	17.3	123.87	31.50	0.27
122.0	170216	149552	1615	5349.9	2800.7	17.4	125.95	31.25	-0.06
123.0	175629	152370	1632	5477.0	2832.3	17.4	128.12	31.82	0.06
124.0	181171	155218	1650	5606.3	2864.1	17.4	130.64	31.97	0.04
125.0	186843	158099	1667	5738.2	2896.0	17.5	133.07	31.80	0.09
126.0	192649	161012	1685	5872.5	2928.0	17.7	135.54	32.15	0.32
127.0	198590	163956	1703	6009.2	2960.1	18.0	138.01	32.13	0.32
128.0	204669	166933	1721	6148.6	2992.3	18.4	140.69	32.30	0.36
129.0	210889	169943	1740	6290.5	3024.8	18.8	143.30	32.66	0.38
130.0	217252	172984	1759	6435.3	3057.5	19.1	146.42	32.74	0.30
131.0	223761	176059	1778	6582.7	3090.3	19.4	149.67	32.81	0.21
132.0	230419	179166	1798	6733.1	3122.8	19.9	152.95	32.87	0.54
133.0	237229	182305	1818	6886.6	3155.7	20.2	155.54	32.91	0.48
134.0	244195	185478	1839	7042.8	3188.3	20.5	158.83	33.14	0.22
135.0	251318	188683	1859	7202.3	3221.0	21.0	161.42	33.30	0.50
136.0	258602	191921	1881	7364.7	3254.1	21.5	164.70	33.63	0.44
137.0	266050	195192	1903	7530.1	3287.5	21.8	167.29	34.28	0.45
138.0	273666	198498	1925	7698.3	3322.7	22.3	170.54	35.10	0.68
139.0	281452	201839	1948	7869.5	3359.4	23.0	173.23	36.09	0.54
INBØARD ENGINE CUTØFF									
139.240	283345	202647	1953	7910.9	3368.3	23.1	173.88	36.42	0.56
140.0	289389	205210	1971	8000.6	3380.6	23.4	90.06	5.09	0.43
141.0	297438	208595	1995	8090.0	3385.7	23.9	86.29	3.61	0.59
142.0	305575	211984	2019	8175.9	3389.4	24.7	85.63	3.61	0.54

TABLE XIII
EARTH-FIXED PLUMBLINE PØSITIØNS, VELØCITIES AND ACCELERATIØNS

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ
ØUTBØARD ENGINE CUTØFF									
142.680	311153	214289	2036	8234.4	3391.9	25.0	86.52	3.61	0.56
143.0	313788	215373	2045	8251.1	3388.8	25.2	5.64	-27.56	0.40
SEPARATIØN									
143.440	317408	216858	2054	8253.6	3376.6	25.4	2.21	-29.58	0.06
144.0	322030	218744	2068	8254.8	3360.1	25.5	1.08	-29.86	0.40
145.0	330318	222100	2100	8255.5	3330.3	25.9	0.43	-29.86	0.31
150.0	371700	238416	2231	8330.0	3208.9	25.9	28.74	-18.04	-0.03
155.0	413713	254237	2362	8476.6	3120.0	26.8	30.05	-17.55	0.42
START IGM									
158.490	443480	265020	2458	8582.0	3059.5	27.8	30.56	-17.22	0.21
160.0	456474	269621	2500	8628.2	3033.5	28.2	30.72	-17.33	0.31
165.0	500003	284568	2652	8784.7	2943.0	34.3	32.11	-19.18	1.96
170.0	544331	299033	2849	8947.5	2841.5	44.4	33.13	-21.11	2.09
175.0	589485	312977	3098	9114.3	2735.9	55.2	33.55	-21.15	2.16
180.0	635478	326391	3401	9283.3	2629.5	66.1	34.14	-21.46	2.17
185.0	682323	339271	3759	9454.9	2522.4	77.4	34.60	-21.50	2.24
190.0	730031	351614	4175	9628.9	2414.7	89.0	35.06	-21.70	2.32
195.0	778616	363416	4649	9805.6	2305.9	101.0	35.56	-21.77	2.44
200.0	828091	374672	5185	9984.8	2196.5	113.2	36.10	-22.13	2.56
205.0	878468	385376	5784	10166.8	2084.5	126.6	36.75	-22.60	2.81
210.0	929763	395514	6453	10351.5	1970.2	141.2	37.16	-23.13	2.91
215.0	981987	405077	7197	10538.8	1854.6	156.4	37.68	-23.11	3.13
220.0	1035156	414060	8017	10729.1	1738.3	171.8	38.44	-23.29	3.11
225.0	1089283	422459	8916	10922.4	1621.2	187.5	38.95	-23.54	3.17
230.0	1144385	430270	9893	11119.2	1503.1	203.5	39.61	-23.65	3.22
235.0	1200480	437490	10951	11319.0	1384.2	219.6	40.17	-23.90	3.34
240.0	1257580	444111	12090	11522.0	1264.2	236.1	41.00	-24.05	3.33
245.0	1315706	450131	13312	11729.0	1143.4	252.8	41.76	-24.28	3.35
250.0	1374876	455545	14618	11939.3	1021.7	269.7	42.41	-24.35	3.41
255.0	1435106	460347	16009	12153.3	898.9	286.9	43.20	-24.62	3.59
260.0	1496415	464532	17487	12370.8	774.9	304.3	43.97	-24.85	3.55
265.0	1558821	468094	19053	12592.3	649.7	322.1	44.69	-25.07	3.59
270.0	1622344	471027	20709	12817.5	523.4	340.1	45.35	-25.44	3.73
275.0	1687002	473325	22455	13046.6	395.4	358.5	46.12	-25.70	3.70

TABLE XIII

EARTH-FIXED PLUMBLINE PØSITIØNS, VELØCITIES AND ACCELERATIØNS

TIME SEC	XE FT	YE FT	ZE FT	DXE FT/S	DYE FT/S	DZE FT/S	DDXE FT/S SQ	DDYE FT/S SQ	DDZE FT/S SQ
280.0	1752815	474980	24294	13279.1	266.3	377.1	46.88	-25.98	3.77
285.0	1819801	475986	26228	13515.9	135.7	396.1	47.77	-26.30	3.74
290.0	1887981	476336	28256	13756.6	3.8	415.4	48.62	-26.57	3.88
295.0	1957376	476022	30382	14002.0	-129.7	435.0	49.57	-26.82	4.10
300.0	2028009	475036	32606	14252.0	-265.1	454.9	50.60	-27.06	4.06
305.0	2099904	473369	34932	14506.9	-402.0	475.2	51.38	-27.57	4.00
310.0	2173085	471013	37358	14766.2	-540.9	495.7	52.43	-27.99	4.18
315.0	2247576	467958	39889	15031.2	-681.7	516.6	53.47	-28.52	4.14
320.0	2323405	464193	42525	15301.4	-824.8	537.9	54.63	-28.79	4.27
325.0	2400599	459707	45268	15577.3	-970.0	559.4	55.94	-29.23	4.33
330.0	2479189	454489	48121	15859.9	-1117.4	581.7	57.18	-29.79	4.56
335.0	2559209	448528	51086	16148.9	-1267.4	604.4	58.43	-30.18	4.50
340.0	2640688	441812	54166	16444.1	-1420.0	627.6	59.66	-31.05	4.50
345.0	2723662	434324	57363	16746.5	-1575.4	651.2	61.26	-31.31	4.73
350.0	2808165	426054	60679	17055.9	-1733.6	675.2	62.66	-31.80	5.00
355.0	2894234	416984	64117	17373.1	-1894.7	699.9	64.19	-32.64	4.92
360.0	2981909	407102	67679	17697.8	-2058.9	725.1	65.69	-33.18	5.12
365.0	3071226	396390	71368	18030.1	-2226.5	750.6	67.21	-33.99	5.06
370.0	3162224	384830	75186	18370.5	-2398.1	776.6	68.85	-34.80	5.21
375.0	3254945	372404	79136	18719.5	-2573.1	803.2	70.72	-35.64	5.35
380.0	3349435	359093	83220	19077.9	-2752.2	830.6	72.56	-36.20	5.58
385.0	3445742	344876	87443	19446.3	-2935.3	858.6	74.65	-36.98	5.57
390.0	3543916	329733	91806	19825.3	-3122.9	886.9	77.01	-37.99	5.77
395.0	3644013	313638	96313	20215.2	-3315.6	915.9	79.03	-39.19	5.83
400.0	3746088	296567	100967	20616.5	-3513.6	946.2	81.62	-40.08	6.24
405.0	3850200	278491	105776	21029.3	-3717.7	977.2	83.41	-41.24	6.33
410.0	3956412	259380	110741	21457.2	-3928.8	1009.0	86.62	-43.33	6.45
415.0	4064792	239186	115868	21897.3	-4150.2	1041.9	89.57	-45.01	6.64
420.0	4175411	217871	121162	22352.8	-4376.5	1075.9	92.72	-45.44	6.84
425.0	4288351	195418	126630	22825.3	-4607.3	1111.3	95.93	-48.39	7.13
430.0	4403689	171765	132276	23313.6	-4855.8	1147.2	99.90	-50.52	7.18
	S-IVB CUTØFF SIGNAL								
433.348	4482287	155230	136155	23652.2	-5024.5	1169.8	103.05	-50.52	5.25
435.0	4521407	146885	138094	23671.4	-5074.1	1175.3	-4.92	-27.00	1.69
440.0	4639694	121179	143991	23642.2	-5207.6	1183.5	-5.94	-26.64	1.82
	ØRBITAL INSERTIØN								
443.348	4718815	103594	147963	23622.4	-5296.8	1189.1	-6.04	-26.67	1.61

TABLE XIV
SPACE-FIXED EPHEMERIS PØSITIØNS, VELØCITIES AND ACCELERATIØNS

TIME SEC	XSP NM	YSP NM	ZSP NM	DXSP FT/S	DYSP FT/S	DZSP FT/S	DDXSP FT/S SQ	DDYSP FT/S SQ	DDZSP FT/S SQ
GUIDANCE REFERENCE RELEASE									
-4.485	1236.807	2763.894	1635.233	-1224.6	548.0	0.0	0.07	0.07	0.00
-4.0	1236.709	2763.937	1635.233	-1224.6	548.0	0.0	0.07	0.07	0.00
-3.0	1236.508	2764.027	1635.233	-1224.7	547.9	0.0	0.07	0.07	0.00
-2.0	1236.306	2764.118	1635.233	-1224.7	547.8	0.0	0.07	0.07	0.00
-1.0	1236.105	2764.208	1635.233	-1224.8	547.7	0.0	0.07	0.07	0.00
0.0	1235.903	2764.298	1635.233	-1224.8	547.6	0.0	0.07	0.07	0.00
FIRST MØTIØN									
0.630	1235.776	2764.355	1635.233	-1224.8	547.5	0.0	4.90	9.48	5.43
LIFTØFF SIGNAL									
0.860	1235.730	2764.375	1635.233	-1223.7	549.7	1.3	4.78	9.56	5.49
1.0	1235.701	2764.388	1635.233	-1223.1	551.0	2.0	4.72	9.61	5.53
2.0	1235.501	2764.479	1635.234	-1218.6	560.6	7.7	4.45	9.92	5.77
3.0	1235.300	2764.573	1635.235	-1214.3	570.5	13.6	4.40	10.19	5.96
4.0	1235.101	2764.667	1635.238	-1210.0	580.7	19.6	4.48	10.43	6.12
5.0	1234.902	2764.764	1635.242	-1205.6	591.1	25.8	4.64	10.66	6.26
6.0	1234.704	2764.862	1635.247	-1201.0	601.7	32.1	4.83	10.88	6.39
7.0	1234.507	2764.962	1635.252	-1196.1	612.5	38.6	5.00	11.11	6.52
8.0	1234.310	2765.064	1635.259	-1191.2	623.6	45.2	5.15	11.35	6.65
9.0	1234.115	2765.167	1635.267	-1186.1	634.9	51.9	5.24	11.61	6.79
10.0	1233.920	2765.273	1635.276	-1181.0	646.5	58.7	5.27	11.89	6.94
11.0	1233.726	2765.380	1635.287	-1175.8	658.4	65.8	5.23	12.18	7.10
12.0	1233.533	2765.489	1635.298	-1170.7	670.6	72.9	5.13	12.50	7.27
13.0	1233.341	2765.601	1635.311	-1165.8	683.1	80.3	4.97	12.83	7.47
14.0	1233.149	2765.714	1635.325	-1161.0	695.9	87.9	4.75	13.18	7.68
15.0	1232.959	2765.830	1635.340	-1156.5	709.1	95.7	4.48	13.55	7.90
16.0	1232.769	2765.947	1635.356	-1152.3	722.7	103.7	4.17	13.92	8.14
17.0	1232.580	2766.067	1635.374	-1148.4	736.7	112.0	3.83	14.31	8.40
18.0	1232.391	2766.190	1635.393	-1144.9	751.0	120.5	3.45	14.69	8.66
19.0	1232.203	2766.315	1635.414	-1141.7	765.8	129.3	3.06	15.08	8.95
20.0	1232.016	2766.442	1635.436	-1139.0	780.9	138.4	2.64	15.47	9.24
21.0	1231.828	2766.572	1635.459	-1136.7	796.4	147.8	2.21	15.86	9.54
22.0	1231.642	2766.704	1635.484	-1134.8	812.3	157.5	1.77	16.24	9.85
23.0	1231.455	2766.839	1635.511	-1133.4	828.6	167.5	1.31	16.62	10.17
24.0	1231.269	2766.977	1635.540	-1132.4	845.2	177.8	0.83	16.99	10.49

TABLE XIV
SPACE-FIXED EPHEMERIS PØSITIØNS, VELØCITIES AND ACCELERATIØNS

TIME SEC	XSP NM	YSP NM	ZSP NM	DXSP FT/S	DYSP FT/S	DZSP FT/S	DDXSP FT/S SQ	DDYSP FT/S SQ	DDZSP FT/S SQ
25.0	1231.083	2767.117	1635.570	-1131.9	862.2	188.4	0.34	17.36	10.80
26.0	1230.897	2767.260	1635.602	-1132.0	879.6	199.4	-0.16	17.73	11.12
27.0	1230.711	2767.406	1635.636	-1132.5	897.4	210.7	-0.69	18.10	11.42
28.0	1230.524	2767.556	1635.671	-1133.6	915.5	222.2	-1.23	18.48	11.72
29.0	1230.338	2767.708	1635.709	-1135.2	934.0	234.1	-1.78	18.87	11.99
30.0	1230.151	2767.863	1635.749	-1137.4	952.9	246.3	-2.25	19.37	12.20
31.0	1229.964	2768.021	1635.790	-1140.1	972.2	258.5	-2.76	19.82	12.36
32.0	1229.776	2768.183	1635.834	-1143.2	992.2	270.9	-3.30	20.29	12.52
33.0	1229.588	2768.348	1635.879	-1146.9	1012.4	283.7	-3.99	20.55	12.93
34.0	1229.399	2768.516	1635.927	-1151.4	1033.1	296.8	-4.67	20.96	13.26
35.0	1229.209	2768.688	1635.977	-1156.5	1054.1	310.1	-5.33	21.53	13.45
36.0	1229.019	2768.863	1636.029	-1162.2	1075.7	323.7	-5.90	21.82	13.62
37.0	1228.827	2769.042	1636.084	-1168.5	1097.6	337.4	-6.52	22.32	13.87
38.0	1228.634	2769.225	1636.140	-1175.5	1119.8	351.5	-7.25	22.49	14.31
39.0	1228.440	2769.411	1636.199	-1183.2	1142.4	365.9	-7.88	22.92	14.71
40.0	1228.245	2769.601	1636.261	-1191.6	1165.4	380.9	-8.78	23.39	15.10
41.0	1228.048	2769.795	1636.325	-1200.9	1188.7	396.1	-9.64	23.54	15.41
42.0	1227.850	2769.992	1636.391	-1210.9	1212.3	411.7	-10.12	23.92	15.74
43.0	1227.650	2770.194	1636.460	-1221.4	1236.3	427.6	-10.64	24.34	16.07
44.0	1227.448	2770.399	1636.532	-1232.7	1260.5	443.9	-11.44	24.35	16.61
45.0	1227.245	2770.609	1636.607	-1244.4	1284.9	460.7	-11.84	24.60	16.98
46.0	1227.039	2770.822	1636.684	-1256.5	1309.4	477.8	-12.23	24.74	17.17
47.0	1226.832	2771.040	1636.764	-1269.1	1334.1	495.0	-12.66	24.95	17.16
48.0	1226.622	2771.262	1636.847	-1282.2	1359.0	512.2	-13.25	25.15	17.13
49.0	1226.410	2771.487	1636.933	-1296.0	1383.8	529.3	-14.31	24.84	17.16
50.0	1226.196	2771.717	1637.021	-1311.0	1408.3	546.4	-15.40	24.41	17.00
51.0	1225.979	2771.951	1637.113	-1327.1	1432.3	563.3	-16.63	23.96	16.79
MACH ØNE									
51.550	1225.858	2772.081	1637.164	-1336.5	1445.4	572.5	-17.21	23.89	16.73
52.0	1225.759	2772.189	1637.207	-1344.3	1456.0	580.0	-17.53	23.63	16.75
53.0	1225.537	2772.430	1637.304	-1362.3	1479.4	596.8	-18.07	23.65	16.82
54.0	1225.311	2772.676	1637.403	-1380.8	1502.8	613.8	-18.64	23.50	17.04
55.0	1225.082	2772.925	1637.506	-1399.7	1526.3	631.1	-19.07	23.80	17.69
56.0	1224.851	2773.178	1637.611	-1419.2	1550.1	649.1	-19.51	24.07	18.34
57.0	1224.616	2773.435	1637.719	-1439.3	1574.2	667.5	-20.49	24.40	18.40
58.0	1224.377	2773.696	1637.831	-1460.4	1598.8	685.8	-21.39	25.04	18.18
59.0	1224.135	2773.962	1637.945	-1482.3	1623.6	704.3	-22.20	25.07	18.84
60.0	1223.890	2774.231	1638.063	-1504.8	1648.7	723.4	-22.64	25.28	19.44
61.0	1223.640	2774.504	1638.184	-1527.9	1673.9	743.2	-23.36	25.51	20.07
62.0	1223.387	2774.782	1638.308	-1552.1	1699.5	763.3	-24.80	25.87	20.25
63.0	1223.130	2775.064	1638.435	-1577.7	1725.5	783.4	-26.15	26.67	19.80

TABLE XIV
SPACE-FIXED EPHEMERIS PØSITIØNS, VELØCITIES AND ACCELERATIØNS

TIME SEC	XSP NM	YSP NM	ZSP NM	DXSP FT/S	DYSP FT/S	DZSP FT/S	DDXSP FT/S SQ	DDYSP FT/S SQ	DDZSP FT/S SQ
64.0	1222.868	2775.350	1638.566	-1604.5	1752.4	803.2	-27.40	27.33	19.87
65.0	1222.602	2775.641	1638.699	-1632.5	1779.8	823.2	-28.39	27.84	20.22
66.0	1222.331	2775.936	1638.837	-1661.6	1807.6	843.8	-29.49	27.92	21.08
67.0	1222.055	2776.236	1638.977	-1691.8	1835.5	865.2	-30.61	28.25	21.73
68.0	1221.774	2776.541	1639.122	-1723.2	1863.9	886.8	-31.94	29.14	21.27
69.0	1221.488	2776.850	1639.269	-1755.7	1893.4	907.7	-33.01	30.32	20.65
MAXIMUM DYNAMIC PRESSURE									
70.000	1221.197	2777.164	1639.421	-1789.2	1923.5	928.8	-33.60	30.30	21.70
71.0	1220.900	2777.483	1639.575	-1823.4	1953.6	951.4	-34.35	29.80	23.63
72.0	1220.597	2777.807	1639.734	-1857.8	1983.5	975.7	-34.44	30.31	24.87
73.0	1220.288	2778.136	1639.897	-1892.4	2013.7	1001.2	-34.51	30.75	26.01
74.0	1219.974	2778.470	1640.064	-1927.4	2044.4	1027.7	-35.32	31.09	26.84
75.0	1219.654	2778.809	1640.235	-1963.9	2075.4	1054.7	-37.50	31.14	27.14
76.0	1219.328	2779.154	1640.411	-2002.7	2106.8	1081.7	-40.01	31.78	26.98
77.0	1218.995	2779.503	1640.591	-2043.9	2138.6	1108.6	-42.00	32.21	26.67
78.0	1218.655	2779.858	1640.776	-2086.6	2170.8	1135.4	-43.07	32.59	26.90
79.0	1218.308	2780.218	1640.965	-2130.3	2203.9	1162.2	-44.12	33.84	26.91
80.0	1217.954	2780.583	1641.159	-2174.9	2237.9	1189.4	-45.02	34.41	27.45
81.0	1217.593	2780.955	1641.357	-2220.4	2272.4	1217.3	-45.45	34.99	28.41
82.0	1217.224	2781.332	1641.559	-2266.4	2307.4	1246.0	-46.48	35.48	28.95
83.0	1216.847	2781.714	1641.767	-2313.6	2343.0	1275.0	-48.00	35.87	29.10
84.0	1216.462	2782.103	1641.979	-2362.5	2379.0	1304.2	-49.58	36.49	29.21
85.0	1216.070	2782.498	1642.196	-2412.8	2415.3	1333.9	-50.62	36.54	30.19
86.0	1215.668	2782.898	1642.418	-2464.4	2451.8	1364.5	-52.28	36.74	31.19
87.0	1215.258	2783.305	1642.646	-2517.3	2488.6	1396.1	-53.46	37.20	31.84
88.0	1214.840	2783.717	1642.878	-2571.6	2525.8	1428.1	-54.71	37.53	32.16
89.0	1214.412	2784.136	1643.116	-2627.0	2563.6	1460.4	-55.98	38.43	32.29
90.0	1213.975	2784.562	1643.359	-2683.8	2602.0	1492.5	-57.29	38.85	32.12
91.0	1213.529	2784.993	1643.607	-2741.8	2641.3	1524.8	-58.40	39.77	32.46
92.0	1213.073	2785.431	1643.861	-2800.8	2681.3	1557.6	-59.27	40.65	33.02
93.0	1212.607	2785.876	1644.120	-2860.7	2722.0	1590.7	-60.47	40.99	33.30
94.0	1212.131	2786.327	1644.385	-2922.0	2763.2	1624.2	-61.82	41.84	33.76
95.0	1211.645	2786.786	1644.655	-2984.7	2805.1	1658.1	-63.36	42.06	34.08
96.0	1211.149	2787.251	1644.931	-3048.7	2847.1	1692.5	-64.50	42.22	34.58
97.0	1210.642	2787.723	1645.212	-3114.1	2889.3	1727.5	-65.93	42.44	35.41
98.0	1210.124	2788.202	1645.499	-3180.8	2931.8	1763.1	-67.27	42.94	35.95
99.0	1209.595	2788.688	1645.793	-3248.8	2974.7	1799.4	-68.47	43.26	36.49
100.0	1209.055	2789.181	1646.092	-3318.2	3018.1	1836.3	-70.08	43.69	37.28
101.0	1208.503	2789.682	1646.397	-3389.1	3061.8	1873.8	-71.53	44.14	37.74
102.0	1207.939	2790.189	1646.709	-3461.3	3105.9	1911.7	-72.68	44.41	38.15
103.0	1207.363	2790.704	1647.027	-3535.0	3150.6	1950.1	-74.31	45.29	38.60

TABLE XIV
SPACE-FIXED EPHEMERIS PØSITIØNS, VELØCITIES AND ACCELERATIØNS

TIME SEC	XSP NM	YSP NM	ZSP NM	DXSP FT/S	DYSP FT/S	DZSP FT/S	DDXSP FT/S SQ	DDYSP FT/S SQ	DDZSP FT/S SQ
104.0	1206.775	2791.227	1647.351	-3610.1	3196.0	1989.0	-75.83	45.89	39.14
105.0	1206.175	2791.757	1647.681	-3686.7	3241.8	2028.3	-77.13	45.99	39.58
106.0	1205.562	2792.294	1648.018	-3764.8	3288.0	2068.1	-78.82	46.64	39.91
107.0	1204.936	2792.839	1648.362	-3844.6	3334.9	2108.2	-80.47	47.58	40.33
108.0	1204.297	2793.392	1648.713	-3925.9	3382.5	2148.7	-81.83	47.94	40.73
109.0	1203.644	2793.953	1649.070	-4008.6	3430.6	2189.7	-83.38	48.37	41.17
110.0	1202.977	2794.521	1649.433	-4092.8	3479.2	2231.1	-84.91	49.15	41.71
111.0	1202.296	2795.098	1649.804	-4178.5	3528.4	2273.1	-86.32	49.58	42.34
112.0	1201.602	2795.683	1650.182	-4265.9	3578.2	2315.8	-88.13	50.18	42.94
113.0	1200.892	2796.276	1650.566	-4354.9	3628.4	2359.1	-89.81	50.57	43.64
114.0	1200.168	2796.878	1650.958	-4445.8	3679.1	2403.0	-91.58	51.11	44.24
115.0	1199.429	2797.487	1651.358	-4538.3	3730.3	2447.5	-93.45	51.64	44.74
116.0	1198.674	2798.106	1651.764	-4632.7	3782.0	2492.6	-95.04	52.25	45.34
117.0	1197.904	2798.733	1652.178	-4728.9	3834.3	2538.2	-97.12	52.72	46.02
118.0	1197.118	2799.368	1652.600	-4826.9	3887.3	2584.5	-98.73	53.44	46.56
119.0	1196.315	2800.012	1653.029	-4926.8	3940.8	2631.4	-100.70	53.97	47.15
120.0	1195.496	2800.665	1653.466	-5028.5	3995.0	2678.8	-102.69	54.67	47.73
121.0	1194.660	2801.328	1653.911	-5132.4	4049.8	2726.9	-104.68	55.38	48.45
122.0	1193.806	2801.999	1654.364	-5238.1	4105.1	2775.6	-106.68	55.50	49.17
123.0	1192.935	2802.679	1654.825	-5345.9	4161.0	2825.2	-108.53	56.52	49.94
124.0	1192.047	2803.369	1655.294	-5455.6	4217.6	2875.5	-110.83	57.23	50.70
125.0	1191.140	2804.067	1655.771	-5567.7	4275.0	2926.5	-113.17	57.69	51.24
126.0	1190.214	2804.776	1656.257	-5682.1	4333.0	2978.0	-115.38	58.67	51.88
127.0	1189.269	2805.494	1656.752	-5798.7	4391.7	3030.3	-117.70	59.24	52.55
128.0	1188.305	2806.222	1657.255	-5917.8	4451.2	3083.2	-120.15	60.03	53.32
129.0	1187.321	2806.959	1657.767	-6039.2	4511.6	3136.9	-122.47	60.94	54.18
130.0	1186.317	2807.707	1658.288	-6163.1	4572.7	3191.6	-125.35	61.70	55.15
131.0	1185.292	2808.465	1658.817	-6289.5	4634.5	3247.0	-128.36	62.47	56.13
132.0	1184.247	2809.233	1659.356	-6418.7	4696.8	3303.0	-131.44	63.48	56.78
133.0	1183.179	2810.011	1659.905	-6550.8	4760.2	3360.0	-133.85	64.08	57.55
134.0	1182.090	2810.800	1660.463	-6685.5	4823.9	3417.8	-136.81	64.89	58.76
135.0	1180.978	2811.599	1661.030	-6823.2	4888.6	3476.3	-139.21	65.78	59.31
136.0	1179.844	2812.409	1661.607	-6963.5	4954.3	3535.8	-142.15	66.78	60.41
137.0	1178.686	2813.230	1662.194	-7106.4	5020.8	3596.4	-144.35	67.92	61.41
138.0	1177.504	2814.062	1662.791	-7251.5	5089.6	3658.4	-147.13	69.47	62.50
139.0	1176.298	2814.906	1663.398	-7398.7	5160.3	3721.9	-149.29	70.81	63.81
	INBØARD ENGINE CUTØFF								
139.240	1176.005	2815.110	1663.546	-7434.4	5177.3	3737.3	-149.79	71.23	64.14
140.0	1175.071	2815.759	1664.015	-7514.2	5208.5	3767.3	-82.72	25.45	26.52
141.0	1173.827	2816.619	1664.637	-7596.4	5233.7	3793.5	-79.75	23.41	24.66
142.0	1172.570	2817.483	1665.264	-7675.9	5257.1	3817.9	-79.14	23.21	24.52

TABLE XIV
SPACE-FIXED EPHEMERIS PØSITIØNS, VELØCITIES AND ACCELERATIØNS

TIME SEC	XSP NM	YSP NM	ZSP NM	DXSP FT/S	DYSP FT/S	DZSP FT/S	DDXSP FT/S SQ	DDYSP FT/S SQ	DDZSP FT/S SQ
ØUTBØARD ENGINE CUTØFF									
142.680	1171.708	2818.072	1665.692	-7730.1	5272.8	3834.7	-79.97	23.42	24.75
143.0	1171.301	2818.349	1665.894	-7746.8	5274.2	3837.7	-15.57	-21.50	-11.96
SEPARATIØN									
143.440	1170.741	2818.730	1666.171	-7753.8	5264.6	3832.4	-13.04	-24.14	-13.58
144.0	1170.026	2819.214	1666.524	-7761.1	5251.0	3824.7	-12.12	-24.46	-14.30
145.0	1168.743	2820.080	1667.154	-7773.0	5226.4	3810.3	-11.50	-24.67	-14.40
150.0	1162.310	2824.338	1670.267	-7888.5	5141.4	3772.6	-33.67	-8.47	-0.79
155.0	1155.748	2828.552	1673.370	-8059.6	5100.6	3769.1	-34.76	-7.54	-0.58
START IGM									
158.490	1151.084	2831.474	1675.535	-8181.6	5074.1	3768.0	-35.09	-7.29	-0.10
160.0	1149.044	2832.734	1676.471	-8234.8	5062.9	3767.8	-35.29	-7.30	-0.19
165.0	1142.194	2836.885	1679.570	-8416.2	5025.5	3762.0	-37.39	-7.60	-2.08
170.0	1135.190	2841.003	1682.661	-8607.8	4982.9	3749.3	-39.02	-8.88	-2.84
175.0	1128.026	2845.085	1685.740	-8804.5	4937.9	3735.0	-39.42	-8.81	-2.80
180.0	1120.699	2849.130	1688.808	-9003.5	4892.8	3721.0	-40.07	-8.96	-2.80
185.0	1113.207	2853.138	1691.864	-9205.2	4847.6	3707.0	-40.52	-8.89	-2.75
190.0	1105.549	2857.108	1694.909	-9409.4	4802.5	3693.1	-41.01	-8.95	-2.78
195.0	1097.721	2861.041	1697.942	-9616.3	4757.2	3679.2	-41.51	-8.86	-2.78
200.0	1089.722	2864.937	1700.964	-9825.9	4711.9	3665.3	-42.14	-9.00	-2.91
205.0	1081.549	2868.796	1703.974	-10039.0	4665.6	3650.1	-42.92	-9.14	-3.16
210.0	1073.198	2872.616	1706.971	-10255.5	4618.4	3633.4	-43.49	-9.46	-3.39
215.0	1064.669	2876.397	1709.954	-10474.9	4571.0	3616.3	-43.99	-9.24	-3.43
220.0	1055.958	2880.139	1712.923	-10697.4	4523.4	3599.6	-44.74	-9.27	-3.29
225.0	1047.063	2883.842	1715.878	-10922.8	4476.0	3582.9	-45.31	-9.37	-3.32
230.0	1037.981	2887.505	1718.820	-11151.9	4428.5	3566.6	-45.95	-9.32	-3.23
235.0	1028.709	2891.130	1721.748	-11384.0	4380.9	3550.6	-46.56	-9.37	-3.30
240.0	1019.244	2894.715	1724.663	-11619.5	4332.9	3534.7	-47.38	-9.35	-3.14
245.0	1009.584	2898.261	1727.566	-11858.9	4285.3	3519.2	-48.16	-9.40	-3.06
250.0	999.726	2901.768	1730.455	-12101.8	4237.5	3504.1	-48.79	-9.32	-2.97
255.0	989.667	2905.235	1733.333	-12348.3	4189.6	3489.1	-49.63	-9.31	-3.03
260.0	979.402	2908.663	1736.198	-12598.6	4141.5	3474.3	-50.41	-9.40	-2.89
265.0	968.931	2912.051	1739.051	-12853.0	4093.1	3459.8	-51.15	-9.43	-2.84
270.0	958.248	2915.400	1741.892	-13111.2	4044.7	3445.6	-51.91	-9.56	-2.95
275.0	947.351	2918.708	1744.721	-13373.7	3995.7	3431.3	-52.70	-9.66	-2.85

TABLE XIV
SPACE-FIXED EPHEMERIS PØSITIØNS, VELØCITIES AND ACCELERATIØNS

TIME SEC	XSP NM	YSP NM	ZSP NM	DXSP FT/S	DYSP FT/S	DZSP FT/S	DDXSP FT/S SQ	DDYSP FT/S SQ	DDZSP FT/S SQ
280.0	936.237	2921.976	1747.539	-13639.7	3946.4	3417.2	-53.50	-9.73	-2.84
285.0	924.902	2925.203	1750.346	-13910.1	3896.9	3403.2	-54.43	-9.85	-2.72
290.0	913.343	2928.390	1753.140	-14184.7	3847.0	3389.5	-55.32	-9.86	-2.73
295.0	901.555	2931.535	1755.924	-14464.1	3796.8	3375.9	-56.31	-9.78	-2.78
300.0	889.536	2934.638	1758.697	-14748.5	3746.1	3362.5	-57.33	-9.82	-2.58
305.0	877.281	2937.700	1761.458	-15037.9	3695.1	3349.4	-58.23	-10.14	-2.56
310.0	864.786	2940.719	1764.209	-15332.2	3643.5	3336.3	-59.36	-10.21	-2.63
315.0	852.046	2943.696	1766.949	-15632.3	3591.3	3323.5	-60.50	-10.49	-2.57
320.0	839.057	2946.630	1769.679	-15938.2	3538.5	3310.8	-61.68	-10.43	-2.49
325.0	825.814	2949.520	1772.398	-16250.0	3485.1	3298.3	-63.05	-10.52	-2.39
330.0	812.311	2952.366	1775.107	-16568.9	3431.4	3286.0	-64.41	-10.63	-2.52
335.0	798.543	2955.167	1777.806	-16894.6	3377.1	3273.8	-65.70	-10.76	-2.31
340.0	784.504	2957.924	1780.495	-17227.0	3322.0	3261.8	-67.12	-11.25	-2.39
345.0	770.189	2960.634	1783.174	-17567.1	3266.0	3249.8	-68.73	-11.04	-2.28
350.0	755.590	2963.299	1785.844	-17914.6	3209.4	3238.3	-70.22	-11.05	-2.35
355.0	740.703	2965.916	1788.504	-18270.4	3152.1	3226.8	-71.92	-11.50	-2.27
360.0	725.519	2968.486	1791.155	-18634.4	3093.8	3215.4	-73.52	-11.57	-2.29
365.0	710.032	2971.008	1793.796	-19006.5	3034.4	3204.3	-75.19	-12.00	-2.22
370.0	694.235	2973.480	1796.428	-19387.5	2973.5	3193.0	-77.00	-12.27	-2.29
375.0	678.122	2975.901	1799.051	-19777.8	2911.6	3182.0	-79.03	-12.54	-2.29
380.0	661.683	2978.271	1801.665	-20178.2	2848.5	3170.8	-80.96	-12.54	-2.25
385.0	644.910	2980.589	1804.270	-20589.4	2784.3	3160.0	-83.16	-12.79	-2.05
390.0	627.794	2982.853	1806.866	-21011.9	2718.6	3149.6	-85.72	-13.06	-2.06
395.0	610.325	2985.063	1809.453	-21446.4	2651.1	3139.2	-88.01	-13.63	-2.13
400.0	592.494	2987.216	1812.032	-21893.3	2582.2	3128.2	-90.77	-13.65	-2.20
405.0	574.290	2989.312	1814.602	-22353.1	2510.8	3117.0	-92.82	-14.24	-2.34
410.0	555.700	2991.348	1817.162	-22829.3	2437.1	3105.7	-96.53	-15.25	-2.56
415.0	536.713	2993.321	1819.712	-23320.5	2357.7	3092.0	-99.85	-15.95	-2.73
420.0	517.315	2995.229	1822.251	-23827.9	2277.9	3079.1	-102.96	-15.60	-2.25
425.0	497.493	2997.071	1824.781	-24352.6	2198.5	3067.6	-106.96	-17.24	-3.03
430.0	477.230	2998.843	1827.298	-24898.0	2107.8	3051.4	-111.38	-18.17	-3.01
S-IVB CUTØFF SIGNAL									
433.348	463.411	2999.988	1828.977	-25274.7	2046.8	3043.9	-114.09	-18.59	-0.54
435.0	456.530	3000.540	1829.802	-25310.2	2007.8	3020.8	-4.78	-25.56	-15.65
440.0	435.694	3002.139	1832.256	-25329.6	1879.2	2942.3	-3.70	-25.43	-15.86
ØRBITAL INSERTIØN									
443.348	421.733	3003.151	1833.862	-25342.3	1793.2	2889.6	-3.57	-25.59	-15.72

TABLE XV
GEØGRAPHIC CØØRDINATES

TIME SEC	EC DIST NM	LØNG DEG	GC LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
	GUIDANCE REFERENCE RELEASE										
-4.485	3441.335	-80.5650	28.3707	0.00	90.00	0.0	90.00	-0.00	1341.6	-0.000	111
-4.0	3441.335	-80.5650	28.3707	0.00	90.00	0.0	90.00	-0.00	1341.6	-0.000	111
-3.0	3441.335	-80.5650	28.3707	0.00	90.00	0.0	90.00	-0.00	1341.6	-0.000	111
-2.0	3441.335	-80.5650	28.3707	0.00	90.00	0.0	90.00	-0.00	1341.6	-0.000	111
-1.0	3441.335	-80.5650	28.3707	0.00	90.00	0.0	90.00	-0.00	1341.6	-0.000	111
0.0	3441.335	-80.5650	28.3707	0.00	90.00	0.0	90.00	-0.00	1341.6	-0.000	111
	FIRST MØTIØN										
0.630	3441.335	-80.5650	28.3707	0.00	90.00	0.0	90.00	0.00	1341.6	-0.000	111
	LIFTØFF SIGNAL										
0.860	3441.335	-80.5650	28.3707	245.98	87.40	2.7	90.00	0.12	1341.5	-0.000	112
1.0	3441.335	-80.5650	28.3707	245.46	87.61	4.4	90.00	0.19	1341.5	0.000	112
2.0	3441.337	-80.5650	28.3707	239.81	88.75	16.5	90.01	0.70	1341.4	0.000	122
3.0	3441.340	-80.5650	28.3707	225.86	89.45	28.9	90.01	1.23	1341.8	0.000	145
4.0	3441.346	-80.5650	28.3707	181.30	89.77	41.5	90.01	1.77	1342.3	0.000	180
5.0	3441.354	-80.5650	28.3707	127.10	89.78	54.5	90.01	2.33	1342.9	0.000	229
6.0	3441.364	-80.5650	28.3707	111.25	89.76	67.8	90.00	2.89	1343.6	0.000	290
7.0	3441.376	-80.5650	28.3707	109.51	89.78	81.4	90.00	3.47	1344.4	0.000	364
8.0	3441.391	-80.5650	28.3707	115.32	89.83	95.3	90.01	4.06	1345.3	0.000	452
9.0	3441.408	-80.5649	28.3707	125.52	89.86	109.5	90.01	4.66	1346.3	0.000	555
10.0	3441.427	-80.5649	28.3707	130.03	89.86	124.0	90.01	5.28	1347.6	0.001	671
11.0	3441.449	-80.5649	28.3707	121.25	89.83	138.8	90.01	5.90	1349.2	0.001	803
12.0	3441.473	-80.5649	28.3707	107.47	89.74	153.9	90.01	6.54	1351.1	0.001	949
13.0	3441.499	-80.5649	28.3707	97.28	89.58	169.3	90.01	7.19	1353.6	0.001	1111
14.0	3441.528	-80.5649	28.3707	91.08	89.35	185.0	90.00	7.84	1356.5	0.001	1288
15.0	3441.560	-80.5649	28.3707	87.25	89.05	201.1	89.99	8.50	1360.0	0.001	1481
16.0	3441.595	-80.5649	28.3707	84.73	88.68	217.4	89.98	9.17	1364.1	0.002	1691
17.0	3441.632	-80.5649	28.3707	82.95	88.25	234.1	89.96	9.84	1369.0	0.002	1917
18.0	3441.672	-80.5649	28.3707	81.62	87.77	251.1	89.94	10.52	1374.5	0.003	2159
19.0	3441.715	-80.5649	28.3707	80.56	87.24	268.5	89.91	11.20	1380.8	0.005	2419
20.0	3441.760	-80.5648	28.3707	79.68	86.67	286.2	89.87	11.88	1387.9	0.007	2697
21.0	3441.809	-80.5648	28.3707	78.94	86.06	304.3	89.83	12.56	1395.7	0.010	2991
22.0	3441.860	-80.5647	28.3707	78.28	85.42	322.7	89.78	13.24	1404.4	0.014	3304
23.0	3441.915	-80.5646	28.3707	77.70	84.76	341.6	89.72	13.92	1413.9	0.018	3635
24.0	3441.972	-80.5645	28.3707	77.17	84.07	360.8	89.66	14.59	1424.2	0.024	3985

TABLE XV
GEØGRAPHIC CØØRDINATES

TIME SEC	EC DIST NM	LØNG DEG	GC LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
25.0	3442.033	-80.5644	28.3707	76.70	83.37	380.4	89.58	15.26	1435.3	0.030	4354
26.0	3442.097	-80.5642	28.3708	76.28	82.64	400.4	89.50	15.93	1447.3	0.038	4742
27.0	3442.164	-80.5641	28.3708	75.91	81.91	420.8	89.41	16.58	1460.2	0.046	5149
28.0	3442.234	-80.5639	28.3708	75.59	81.16	441.7	89.31	17.22	1473.9	0.057	5577
29.0	3442.308	-80.5637	28.3709	75.34	80.40	463.0	89.21	17.86	1488.5	0.068	6023
30.0	3442.384	-80.5634	28.3709	75.11	79.62	484.6	89.10	18.48	1504.1	0.082	6490
31.0	3442.465	-80.5632	28.3710	75.04	78.87	506.8	88.99	19.09	1520.5	0.097	6977
32.0	3442.548	-80.5629	28.3711	75.10	78.11	529.6	88.89	19.69	1537.8	0.113	7486
33.0	3442.635	-80.5625	28.3712	75.09	77.34	552.7	88.78	20.28	1555.9	0.132	8015
34.0	3442.726	-80.5621	28.3712	75.06	76.57	576.4	88.66	20.85	1575.1	0.153	8565
35.0	3442.820	-80.5617	28.3713	75.05	75.78	600.6	88.53	21.40	1595.3	0.176	9138
36.0	3442.918	-80.5612	28.3714	75.10	75.00	625.3	88.41	21.94	1616.4	0.201	9731
37.0	3443.019	-80.5607	28.3716	75.15	74.22	650.6	88.28	22.47	1638.3	0.229	10347
38.0	3443.124	-80.5602	28.3717	75.16	73.44	676.3	88.15	22.97	1661.1	0.259	10984
39.0	3443.233	-80.5596	28.3718	75.13	72.66	702.6	88.01	23.45	1684.9	0.292	11645
40.0	3443.345	-80.5589	28.3720	75.09	71.87	729.5	87.86	23.92	1709.7	0.327	12328
41.0	3443.461	-80.5582	28.3721	75.03	71.07	757.0	87.70	24.37	1735.6	0.366	13033
42.0	3443.581	-80.5575	28.3723	74.96	70.28	785.1	87.54	24.79	1762.2	0.408	13761
43.0	3443.705	-80.5566	28.3725	74.89	69.51	813.8	87.37	25.21	1789.7	0.453	14513
44.0	3443.832	-80.5558	28.3727	74.79	68.74	843.1	87.20	25.60	1818.1	0.501	15288
45.0	3443.963	-80.5548	28.3729	74.65	67.99	872.8	87.01	25.98	1847.0	0.553	16086
46.0	3444.099	-80.5538	28.3732	74.51	67.26	903.0	86.82	26.35	1876.6	0.608	16908
47.0	3444.238	-80.5527	28.3734	74.39	66.55	933.6	86.64	26.69	1906.6	0.667	17753
48.0	3444.381	-80.5516	28.3737	74.31	65.86	964.5	86.46	27.02	1937.3	0.730	18623
49.0	3444.528	-80.5504	28.3740	74.24	65.17	995.5	86.28	27.32	1968.4	0.796	19516
50.0	3444.678	-80.5491	28.3743	74.17	64.46	1026.5	86.09	27.58	2000.1	0.866	20432
51.0	3444.833	-80.5477	28.3746	74.10	63.72	1057.2	85.91	27.80	2032.2	0.941	21373
	MACH ØNE										
51.550	3444.919	-80.5469	28.3748	74.07	63.31	1074.0	85.81	27.91	2050.1	0.984	21895
52.0	3444.991	-80.5463	28.3750	74.05	62.97	1087.8	85.73	27.99	2064.9	1.020	22330
53.0	3445.152	-80.5448	28.3754	73.99	62.22	1118.5	85.54	28.15	2097.8	1.103	23310
54.0	3445.317	-80.5432	28.3758	73.92	61.48	1149.5	85.35	28.29	2131.1	1.191	24311
55.0	3445.485	-80.5415	28.3762	73.83	60.77	1181.0	85.16	28.43	2165.0	1.283	25333
56.0	3445.656	-80.5397	28.3766	73.72	60.07	1213.4	84.96	28.56	2199.6	1.380	26375
57.0	3445.831	-80.5379	28.3771	73.61	59.38	1246.6	84.76	28.68	2235.0	1.481	27438
58.0	3446.010	-80.5359	28.3776	73.55	58.69	1280.5	84.57	28.79	2271.3	1.588	28523
59.0	3446.191	-80.5339	28.3781	73.49	58.00	1315.0	84.38	28.88	2308.5	1.700	29629
60.0	3446.377	-80.5318	28.3786	73.41	57.32	1350.3	84.18	28.97	2346.5	1.816	30756
61.0	3446.566	-80.5296	28.3792	73.30	56.66	1386.5	83.97	29.05	2385.1	1.939	31906
62.0	3446.758	-80.5273	28.3798	73.21	56.00	1423.5	83.77	29.12	2424.8	2.066	33076
63.0	3446.955	-80.5248	28.3805	73.14	55.31	1461.4	83.57	29.17	2465.8	2.200	34269

TABLE XV
GEØGRAPHIC CØØRDINATES

TIME SEC	EC DIST NM	LØNG DEG	GC LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
64.0	3447.154	-80.5223	28.3811	73.14	54.63	1500.4	83.39	29.20	2508.1	2.339	35483
65.0	3447.358	-80.5197	28.3818	73.15	53.95	1540.4	83.22	29.21	2551.6	2.484	36719
66.0	3447.565	-80.5169	28.3825	73.14	53.27	1581.5	83.05	29.22	2596.2	2.636	37977
67.0	3447.775	-80.5141	28.3833	73.11	52.59	1623.7	82.86	29.22	2641.9	2.795	39257
68.0	3447.989	-80.5111	28.3841	73.09	51.91	1666.9	82.68	29.20	2688.9	2.960	40560
69.0	3448.207	-80.5079	28.3849	73.14	51.24	1711.3	82.53	29.18	2737.1	3.132	41884
	MAXIMUM DYNAMIC PRESSURE										
70.000	3448.429	-80.5047	28.3858	73.20	50.58	1756.7	82.39	29.15	2786.4	3.311	43232
71.0	3448.654	-80.5013	28.3867	73.19	49.94	1803.3	82.22	29.11	2836.6	3.498	44602
72.0	3448.883	-80.4978	28.3876	73.12	49.33	1851.0	82.02	29.09	2887.5	3.692	45996
73.0	3449.117	-80.4941	28.3886	73.01	48.75	1899.9	81.81	29.08	2939.1	3.893	47414
74.0	3449.354	-80.4903	28.3896	72.89	48.20	1950.0	81.59	29.07	2991.7	4.103	48857
75.0	3449.595	-80.4864	28.3906	72.76	47.64	2001.3	81.37	29.05	3045.8	4.320	50325
76.0	3449.841	-80.4823	28.3917	72.67	47.06	2054.0	81.16	29.00	3101.5	4.545	51819
77.0	3450.091	-80.4781	28.3929	72.60	46.45	2108.0	80.96	28.92	3159.1	4.779	53337
78.0	3450.344	-80.4737	28.3941	72.56	45.84	2163.2	80.78	28.83	3217.9	5.021	54879
79.0	3450.602	-80.4692	28.3953	72.54	45.24	2219.7	80.61	28.74	3278.1	5.273	56445
80.0	3450.863	-80.4645	28.3966	72.52	44.67	2277.6	80.45	28.65	3339.6	5.534	58035
81.0	3451.129	-80.4596	28.3980	72.51	44.11	2336.9	80.28	28.56	3402.3	5.804	59652
82.0	3451.399	-80.4545	28.3993	72.48	43.58	2397.4	80.12	28.48	3466.0	6.084	61294
83.0	3451.673	-80.4493	28.4008	72.46	43.06	2459.3	79.96	28.39	3531.0	6.373	62962
84.0	3451.952	-80.4439	28.4023	72.45	42.53	2522.6	79.81	28.29	3597.6	6.673	64657
85.0	3452.235	-80.4383	28.4038	72.44	42.01	2587.0	79.66	28.19	3665.3	6.983	66377
86.0	3452.522	-80.4325	28.4054	72.41	41.49	2653.	79.50	28.08	3734.5	7.303	68124
87.0	3452.814	-80.4265	28.4071	72.36	40.98	2720.5	79.33	27.96	3805.1	7.634	69898
88.0	3453.110	-80.4204	28.4088	72.33	40.48	2789.4	79.17	27.84	3877.1	7.976	71698
89.0	3453.410	-80.4140	28.4106	72.30	39.99	2859.6	79.02	27.72	3950.5	8.329	73524
90.0	3453.715	-80.4074	28.4124	72.28	39.51	2931.1	78.88	27.60	4025.1	8.694	75379
91.0	3454.024	-80.4006	28.4143	72.28	39.04	3003.9	78.75	27.47	4101.1	9.070	77260
92.0	3454.338	-80.3936	28.4163	72.29	38.58	3078.3	78.62	27.35	4178.4	9.459	79168
93.0	3454.656	-80.3864	28.4183	72.29	38.14	3154.1	78.50	27.23	4257.1	9.859	81105
94.0	3454.979	-80.3789	28.4203	72.30	37.71	3231.3	78.39	27.11	4337.2	10.271	83070
95.0	3455.307	-80.3713	28.4225	72.31	37.28	3310.1	78.27	26.98	4418.9	10.696	85064
96.0	3455.640	-80.3634	28.4247	72.32	36.86	3390.1	78.16	26.85	4501.7	11.134	87086
97.0	3455.977	-80.3552	28.4269	72.32	36.44	3471.4	78.05	26.72	4585.8	11.585	89137
98.0	3456.319	-80.3468	28.4293	72.32	36.03	3554.2	77.94	26.59	4671.4	12.049	91216
99.0	3456.665	-80.3382	28.4317	72.31	35.63	3638.4	77.82	26.45	4758.3	12.526	93325
100.0	3457.017	-80.3294	28.4341	72.30	35.24	3724.3	77.71	26.32	4846.8	13.017	95463
101.0	3457.373	-80.3203	28.4367	72.29	34.85	3811.7	77.60	26.18	4936.8	13.522	97629
102.0	3457.734	-80.3109	28.4393	72.29	34.47	3900.5	77.49	26.04	5028.1	14.042	99826
103.0	3458.100	-80.3012	28.4420	72.28	34.09	3990.9	77.39	25.90	5121.1	14.575	102052

TABLE XV
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TIME SEC	EC DIST NM	LØNG DEG	GC LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
104.0	3458.471	-80.2914	28.4448	72.27	33.73	4083.1	77.28	25.76	5215.7	15.123	104307
105.0	3458.846	-80.2812	28.4476	72.27	33.37	4176.7	77.19	25.62	5311.8	15.687	106593
106.0	3459.227	-80.2707	28.4505	72.27	33.01	4271.9	77.09	25.48	5409.4	16.265	108909
107.0	3459.613	-80.2600	28.4535	72.27	32.66	4368.9	77.00	25.34	5508.8	16.859	111255
108.0	3460.003	-80.2490	28.4566	72.27	32.31	4467.6	76.91	25.20	5609.9	17.469	113632
109.0	3460.399	-80.2377	28.4597	72.28	31.98	4567.8	76.83	25.05	5712.4	18.095	116040
110.0	3460.800	-80.2261	28.4630	72.29	31.65	4669.7	76.74	24.91	5816.7	18.737	118478
111.0	3461.206	-80.2143	28.4663	72.29	31.32	4773.4	76.66	24.77	5922.6	19.395	120948
112.0	3461.617	-80.2021	28.4697	72.30	31.00	4878.9	76.59	24.63	6030.3	20.071	123449
113.0	3462.033	-80.1896	28.4732	72.30	30.69	4986.1	76.51	24.49	6139.7	20.763	125983
114.0	3462.455	-80.1767	28.4768	72.31	30.38	5095.3	76.43	24.34	6251.0	21.473	128548
115.0	3462.881	-80.1636	28.4804	72.31	30.07	5206.2	76.36	24.20	6364.1	22.200	131145
116.0	3463.313	-80.1501	28.4842	72.31	29.77	5319.2	76.28	24.06	6479.1	22.946	133774
117.0	3463.751	-80.1363	28.4880	72.32	29.47	5434.0	76.21	23.91	6596.0	23.710	136436
118.0	3464.194	-80.1222	28.4920	72.32	29.18	5550.9	76.14	23.77	6714.9	24.493	139131
119.0	3464.642	-80.1077	28.4960	72.33	28.89	5669.6	76.08	23.62	6835.7	25.294	141858
120.0	3465.095	-80.0929	28.5001	72.33	28.60	5790.5	76.01	23.48	6958.6	26.115	144618
121.0	3465.555	-80.0777	28.5043	72.34	28.32	5913.6	75.95	23.33	7083.6	26.955	147413
122.0	3466.019	-80.0622	28.5087	72.34	28.05	6038.7	75.88	23.19	7210.7	27.816	150240
123.0	3466.489	-80.0463	28.5131	72.35	27.77	6166.0	75.82	23.04	7339.9	28.697	153102
124.0	3466.965	-80.0300	28.5176	72.35	27.50	6295.6	75.76	22.90	7471.3	29.598	155998
125.0	3467.447	-80.0133	28.5223	72.36	27.24	6427.6	75.70	22.76	7605.2	30.520	158928
126.0	3467.934	-79.9963	28.5270	72.37	26.98	6562.0	75.65	22.61	7741.4	31.464	161893
127.0	3468.427	-79.9788	28.5319	72.37	26.72	6698.7	75.59	22.47	7880.0	32.430	164892
128.0	3468.925	-79.9610	28.5368	72.38	26.46	6838.1	75.54	22.32	8021.2	33.418	167927
129.0	3469.430	-79.9427	28.5419	72.39	26.20	6980.0	75.49	22.18	8164.9	34.428	170997
130.0	3469.940	-79.9240	28.5471	72.40	25.95	7124.8	75.44	22.03	8311.4	35.462	174103
131.0	3470.456	-79.9049	28.5524	72.41	25.71	7272.1	75.39	21.89	8460.5	36.519	177246
132.0	3470.979	-79.8854	28.5578	72.42	25.46	7422.0	75.34	21.74	8612.2	37.600	180424
133.0	3471.507	-79.8654	28.5633	72.43	25.21	7575.3	75.30	21.60	8767.1	38.705	183639
134.0	3472.041	-79.8450	28.5690	72.44	24.97	7730.9	75.25	21.45	8924.5	39.836	186891
135.0	3472.581	-79.8241	28.5747	72.45	24.73	7889.8	75.21	21.30	9085.1	40.991	190180
136.0	3473.127	-79.8027	28.5807	72.46	24.49	8051.6	75.17	21.16	9248.6	42.173	193505
137.0	3473.680	-79.7809	28.5867	72.47	24.26	8216.5	75.13	21.01	9415.1	43.380	196868
138.0	3474.239	-79.7585	28.5928	72.48	24.04	8384.8	75.09	20.88	9585.0	44.615	200271
139.0	3474.805	-79.7357	28.5991	72.50	23.83	8556.6	75.05	20.75	9758.2	45.877	203715
	INBØARD ENGINE CUTØFF										
139.240	3474.941	-79.7302	28.6007	72.50	23.78	8598.2	75.04	20.72	9800.1	46.184	204547
140.0	3475.376	-79.7124	28.6056	72.51	23.64	8685.5	75.02	20.62	9888.6	47.163	207192
141.0	3475.950	-79.6888	28.6121	72.52	23.47	8769.9	75.01	20.50	9974.4	48.467	210688
142.0	3476.526	-79.6650	28.6186	72.54	23.30	8850.7	75.00	20.37	10056.5	49.785	214193

TABLE XV
GEØGRAPHIC CØØRDINATES

TIME SEC	EC DIST NM	LØNG DEG	GC LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
	ØUTBØARD ENGINE CUTØFF										
142.680	3476.918	-79.6486	28.6231	72.55	23.18	8905.7	75.00	20.28	10112.4	50.688	216580
143.0	3477.102	-79.6409	28.6252	72.55	23.13	8919.9	75.00	20.24	10127.1	51.114	217702
	SEPARATIØN										
143.440	3477.355	-79.6303	28.6282	72.56	23.06	8917.6	75.00	20.18	10125.4	51.700	219241
144.0	3477.676	-79.6168	28.6319	72.57	22.97	8912.4	75.01	20.10	10121.1	52.448	221196
145.0	3478.248	-79.5925	28.6385	72.58	22.82	8901.9	75.02	19.96	10112.0	53.789	224680
150.0	3481.041	-79.4713	28.6717	72.64	22.03	8926.7	75.06	19.27	10143.7	60.480	241681
155.0	3483.766	-79.3483	28.7052	72.71	21.28	9032.6	75.08	18.64	10255.7	67.264	258277
	START IGM										
158.490	3485.636	-79.2613	28.7289	72.75	20.77	9111.1	75.10	18.21	10338.4	72.065	269664
160.0	3486.436	-79.2233	28.7392	72.77	20.56	9146.0	75.10	18.03	10375.0	74.160	274536
165.0	3489.051	-79.0960	28.7735	72.87	19.82	9264.6	75.16	17.41	10499.6	81.172	290460
170.0	3491.605	-78.9664	28.8083	73.00	19.04	9388.0	75.23	16.75	10629.2	88.306	306012
175.0	3494.091	-78.8344	28.8434	73.13	18.25	9516.2	75.31	16.07	10763.5	95.564	321156
180.0	3496.510	-78.6999	28.8788	73.26	17.48	9648.8	75.39	15.42	10901.8	102.951	335889
185.0	3498.861	-78.5629	28.9146	73.39	16.73	9785.9	75.47	14.78	11044.3	110.469	350213
190.0	3501.146	-78.4234	28.9508	73.52	16.00	9927.5	75.55	14.15	11191.1	118.118	364132
195.0	3503.364	-78.2813	28.9873	73.65	15.28	10073.5	75.64	13.54	11342.0	125.903	377647
200.0	3505.516	-78.1365	29.0242	73.79	14.59	10224.1	75.72	12.94	11497.1	133.825	390760
205.0	3507.601	-77.9890	29.0615	73.92	13.90	10379.1	75.82	12.35	11656.4	141.886	403471
210.0	3509.619	-77.8387	29.0990	74.07	13.23	10538.3	75.91	11.77	11819.8	150.090	415773
215.0	3511.570	-77.6856	29.1369	74.21	12.57	10701.9	76.01	11.20	11987.3	158.439	427664
220.0	3513.453	-77.5296	29.1752	74.36	11.93	10870.4	76.12	10.65	12159.5	166.934	439147
225.0	3515.270	-77.3708	29.2137	74.50	11.32	11043.6	76.22	10.12	12336.1	175.580	450226
230.0	3517.020	-77.2089	29.2526	74.65	10.72	11222.2	76.32	9.60	12517.9	184.379	460904
235.0	3518.706	-77.0440	29.2918	74.80	10.14	11405.5	76.43	9.10	12704.1	193.334	471186
240.0	3520.327	-76.8760	29.3313	74.94	9.58	11593.5	76.53	8.61	12895.0	202.447	481076
245.0	3521.883	-76.7048	29.3712	75.09	9.05	11787.3	76.64	8.14	13091.3	211.723	490577
250.0	3523.377	-76.5303	29.4114	75.24	8.53	11986.0	76.74	7.68	13292.4	221.165	499695
255.0	3524.809	-76.3526	29.4519	75.38	8.03	12189.8	76.85	7.24	13498.4	230.775	508435
260.0	3526.178	-76.1714	29.4927	75.53	7.54	12398.8	76.96	6.82	13709.4	240.557	516802
265.0	3527.488	-75.9869	29.5339	75.68	7.08	12613.1	77.07	6.41	13925.6	250.514	524799
270.0	3528.737	-75.7988	29.5754	75.83	6.63	12832.7	77.18	6.01	14146.9	260.651	532434
275.0	3529.927	-75.6071	29.6172	75.98	6.20	13057.5	77.30	5.63	14373.4	270.970	539711

TABLE XV
GEØGRAPHIC CØØRDINATES

TIME SEC	EC DIST NM	LØNG DEG	GC LAT DEG	VEL-AZ DEG	VEL-ELEV DEG	EF VEL FT/S	HEAD DEG	FLT-PATH DEG	SF VEL FT/S	RANGE NM	ALTITUDE FT
280.0	3531.059	-75.4117	29.6593	76.13	5.79	13287.2	77.41	5.27	14604.5	281.476	546632
285.0	3532.134	-75.2126	29.7017	76.28	5.39	13522.3	77.53	4.91	14841.1	292.171	553206
290.0	3533.152	-75.0097	29.7444	76.43	5.02	13762.9	77.65	4.58	15082.9	303.059	559439
295.0	3534.115	-74.8029	29.7874	76.59	4.66	14009.3	77.77	4.25	15330.5	314.145	565335
300.0	3535.023	-74.5921	29.8307	76.74	4.31	14261.7	77.89	3.94	15583.9	325.433	570902
305.0	3535.879	-74.3772	29.8743	76.90	3.98	14520.2	78.01	3.65	15843.3	336.927	576145
310.0	3536.682	-74.1582	29.9182	77.05	3.66	14784.5	78.14	3.36	16108.5	348.631	581073
315.0	3537.434	-73.9348	29.9624	77.21	3.36	15055.5	78.26	3.09	16380.3	360.551	585690
320.0	3538.136	-73.7071	30.0068	77.37	3.08	15333.0	78.39	2.83	16658.6	372.691	590013
325.0	3538.789	-73.4750	30.0516	77.53	2.81	15617.5	78.52	2.59	16943.7	385.057	594020
330.0	3539.395	-73.2382	30.0965	77.69	2.55	15909.8	78.65	2.35	17236.6	397.653	597747
335.0	3539.955	-72.9967	30.1418	77.86	2.31	16209.8	78.79	2.13	17537.1	410.486	601195
340.0	3540.469	-72.7504	30.1872	78.02	2.08	16517.2	78.93	1.92	17845.0	423.563	604371
345.0	3540.940	-72.4991	30.2329	78.19	1.86	16833.0	79.07	1.72	18161.2	436.888	607281
350.0	3541.369	-72.2427	30.2789	78.36	1.66	17157.0	79.21	1.54	18485.7	450.469	609936
355.0	3541.757	-71.9811	30.3250	78.53	1.47	17490.1	79.35	1.36	18819.0	464.312	612345
360.0	3542.107	-71.7141	30.3714	78.71	1.29	17831.9	79.50	1.20	19161.2	478.425	614510
365.0	3542.420	-71.4416	30.4179	78.88	1.13	18182.6	79.65	1.05	19512.1	492.813	616469
370.0	3542.697	-71.1634	30.4646	79.06	0.98	18542.6	79.80	0.91	19872.4	507.485	618202
375.0	3542.940	-70.8794	30.5115	79.24	0.84	18912.6	79.95	0.78	20242.6	522.449	619731
380.0	3543.151	-70.5894	30.5586	79.42	0.71	19293.3	80.11	0.66	20623.5	537.711	621066
385.0	3543.333	-70.2932	30.6058	79.61	0.59	19685.3	80.27	0.56	21015.7	553.282	622221
390.0	3543.488	-69.9907	30.6531	79.79	0.49	20089.4	80.43	0.46	21419.9	569.171	623210
395.0	3543.617	-69.6815	30.7005	79.98	0.40	20505.8	80.60	0.37	21836.4	585.386	624046
400.0	3543.723	-69.3656	30.7479	80.18	0.32	20935.2	80.77	0.30	22265.9	601.940	624741
405.0	3543.808	-69.0427	30.7955	80.38	0.25	21377.8	80.94	0.23	22708.6	618.841	625310
410.0	3543.874	-68.7126	30.8430	80.58	0.18	21837.2	81.12	0.17	23168.1	636.102	625766
415.0	3543.923	-68.3750	30.8906	80.78	0.12	22311.4	81.30	0.11	23642.4	653.736	626119
420.0	3543.954	-68.0296	30.9381	80.99	0.08	22802.7	81.49	0.07	24133.7	671.755	626382
425.0	3543.975	-67.6762	30.9856	81.20	0.05	23312.2	81.68	0.05	24643.3	690.173	626571
430.0	3543.985	-67.3145	31.0330	81.42	0.01	23841.6	81.87	0.01	25172.7	709.006	626643
	S-IVB CUTØFF SIGNAL										
433.348	3543.985	-67.0675	31.0647	81.56	-0.00	24208.3	82.00	-0.00	25539.5	721.854	626680
435.0	3543.986	-66.9444	31.0802	81.63	-0.00	24237.6	82.07	-0.00	25568.8	728.252	626697
440.0	3543.985	-66.5717	31.1266	81.85	-0.00	24237.8	82.27	-0.00	25569.1	747.615	626743
	ØRBITAL INSERTIØN										
443.348	3543.984	-66.3219	31.1569	81.99	-0.00	24238.2	82.41	-0.00	25569.4	760.581	626772

TABLE XVI
S-IB STAGE FREE FLIGHT TRAJECTØRY

	EARTH-FIXED PLUMBLINE PØSITIØNS			EARTH-FIXED PLUMBLINE VELØCITIES						
TIME SEC	XE M	YE M	ZE M	DXE M/S	DYE M/S	DZE M/S	ALTITUDE M	RANGE M	LØNG DEG	LAT DEG
160.0	137965	81638	758	2479.4	863.4	9.8	83111	136359	79.2345	28.9007
180.0	187478	97059	983	2472.1	679.0	12.7	99772	184820	78.7594	29.0288
200.0	236843	108804	1266	2464.4	495.7	15.6	113126	233013	78.2856	29.1538
220.0	286046	116891	1609	2455.7	313.1	18.7	123186	281002	77.8125	29.2761
240.0	335067	121332	2015	2446.2	131.1	21.9	129961	328843	77.3396	29.3957
260.0	383887	122135	2487	2435.7	-50.6	25.3	133459	376594	76.8662	29.5128
280.0	432487	119307	3027	2424.2	-232.2	28.7	133682	424310	76.3919	29.6274
300.0	480848	112848	3637	2411.8	-413.7	32.3	130630	472048	75.9161	29.7397
320.0	528951	102757	4319	2398.3	-595.5	36.0	124301	519863	75.4382	29.8498
340.0	576775	89026	5075	2383.9	-777.6	39.7	114689	567812	74.9577	29.9576
360.0	624300	71648	5909	2368.4	-960.3	43.6	101784	615951	74.4741	30.0634
380.0	671502	50610	6820	2351.5	-1143.6	47.6	85576	664338	73.9867	30.1672
400.0	718307	25924	7811	2324.9	-1323.1	51.4	66071	712975	73.4956	30.2688
420.0	763778	-1877	8861	2166.1	-1420.7	52.2	43692	760957	73.0099	30.3665
440.0	797119	-25307	9695	919.3	-722.5	24.1	24493	796728	72.6470	30.4376
460.0	805731	-33372	9930	168.9	-242.1	5.0	17570	806254	72.5502	30.4562
480.0	807547	-37577	9989	38.3	-189.4	1.6	13628	808580	72.5265	30.4606
500.0	807820	-41062	10006	-2.8	-160.4	0.4	10205	809288	72.5193	30.4618
520.0	807632	-44034	10009	-13.2	-137.2	-0.0	7233	809475	72.5174	30.4621
540.0	807351	-46584	10008	-14.2	-118.8	-0.1	4668	809517	72.5169	30.4621
560.0	807076	-48819	10006	-13.1	-105.3	-0.1	2416	809525	72.5168	30.4621
580.0	806825	-50817	10004	-12.0	-95.1	-0.1	402	809528	72.5168	30.4620
	IMPACT									
584.2	806775	-51216	10003	-11.8	-93.3	-0.1	0	809528	72.5168	30.4620

TABLE XVII
S-IB STAGE FREE FLIGHT TRAJECTØRY

TIME SEC	EARTH-FIXED PLUMBLINE PØSITIØNS XE FT	YE FT	ZE FT	EARTH-FIXED PLUMBLINE VELØCITIES DXE FT/S	DYE FT/S	DZE FT/S	ALTITUDE FT	RANGE NM	LØNG DEG	LAT DEG
160.0	452640	267841	2488	8134.4	2832.7	32.3	272675	73.581	79.2345	28.9007
180.0	615084	318435	3225	8110.4	2227.6	41.5	327337	99.730	78.7594	29.0288
200.0	777044	356970	4152	8085.2	1626.2	51.3	371148	125.736	78.2856	29.1538
220.0	938470	383501	5278	8056.9	1027.2	61.4	404153	151.631	77.8125	29.2761
240.0	1099300	398070	6611	8025.5	430.0	72.0	426382	177.446	77.3396	29.3957
260.0	1259471	400707	8159	7991.1	-166.2	82.9	437857	203.213	76.8662	29.5128
280.0	1418921	391428	9930	7953.4	-761.7	94.2	438588	228.961	76.3919	29.6274
300.0	1577587	370237	11931	7912.6	-1357.4	105.9	428576	254.720	75.9161	29.7397
320.0	1735404	337128	14169	7868.6	-1953.7	118.0	407811	280.522	75.4382	29.8498
340.0	1892307	292081	16652	7821.2	-2551.2	130.4	376275	306.395	74.9577	29.9576
360.0	2048228	235067	19385	7770.4	-3150.6	143.1	333938	332.372	74.4741	30.0634
380.0	2203091	166045	22377	7714.8	-3751.8	156.1	280762	358.481	73.9867	30.1672
400.0	2356650	85051	25628	7627.7	-4340.9	168.8	216769	384.727	73.4956	30.2688
420.0	2505833	-6161	29073	7106.5	-4661.0	171.3	143345	410.618	73.0099	30.3665
440.0	2615221	-83030	31808	3016.0	-2370.5	79.1	80359	429.920	72.6470	30.4376
460.0	2643473	-109489	32578	554.2	-794.2	16.4	57646	435.060	72.5502	30.4562
480.0	2649433	-123287	32773	125.6	-621.3	5.1	44710	436.315	72.5265	30.4606
500.0	2650328	-134720	32829	-9.3	-526.3	1.2	33481	436.698	72.5193	30.4618
520.0	2649711	-144471	32838	-43.4	-450.0	-0.0	23731	436.798	72.5174	30.4621
540.0	2648789	-152838	32834	-46.6	-389.9	-0.3	15315	436.821	72.5169	30.4621
560.0	2647888	-160170	32827	-43.1	-345.4	-0.4	7928	436.826	72.5168	30.4621
580.0	2647064	-166726	32820	-39.3	-311.9	-0.3	1320	436.827	72.5168	30.4620
IMPACT										
584.2	2646899	-168035	32819	-38.6	-306.0	-0.3	0	436.827	72.5168	30.4620

APPENDIX

DEFINITIONS OF SYMBOLS

Symbol	Definitions
XE,YE,ZE DXE, DYE, DZE DDXE,DDYE, DDZE	Position, velocity and acceleration components in the Earth-Fixed Plumbline Coordinate System. The projection of the center of gravity of the complete vehicle at first motion onto the Fischer Ellipsoid of 1960 is the origin of this coordinate system. At this origin the X-Z plane is tangent to the reference ellipsoid. The positive X-axis points downrange in the flight azimuth direction, 72.0 deg E of N. The Y-axis is normal to the X-Z plane and positive above the origin. The Z axis is normal to the X-Y or flight plane and is in a right hand relation to the X-Y axes with the positive direction 162.0 deg E of N. The earth-fixed coordinate system is shown in Figure 18.
XSP,YSP,ZSP DXSP,DYSP,DZSP DDXSP,DDYSP,DDZSP	Position, velocity and acceleration components in the Space-Fixed Ephemeris Coordinate System. The origin of this system is located at the geocentric center of the earth. The Z-axis points north along the earth's axis of rotation (through the north pole). The X-Y plane is coincident with the equatorial plane. The X-axis points through the vernal equinox. The reference equinox and equator are the mean equinox and equator of date for the epoch of midnight at zero hours on the day of launch. The Y-axis is normal to the X-Z plane and is in a right hand relation to the X-,Z-axes. The direction of the coordinate axes remain fixed in space although the origin continues to move with the center of the earth. The space-fixed ephemeris coordinate system is shown in Figure 18.

DEFINITIONS OF SYMBOLS (CONT'D)

Symbol	Definition
E.C. DIST LONG G.C.LAT	Position of vehicle in the Geographic Coordinate System. Position in this system is defined by the radius vector from the vehicle to the geocentric center of the earth (E.C.DIST), geocentric latitude (G.C. LAT) and longitude (LONG). The subvehicle point is the intersection of the reference ellipsoid and the reference ellipsoid normal passing through the point of interest (vehicle's center of gravity). The geocentric latitude and longitude refer to the subvehicle point. Geocentric latitude is the angle between the vector from the earth's geocentric center to the subvehicle point and the equatorial plane. Longitude is the angle between the projection of the radius vector into the equatorial plane and the Greenwich meridian, measured positive east of the Greenwich meridian.
E.F. VEL VEL-AZ VEL-ELEV	Earth-fixed velocity of vehicle in the Geographic Coordinate System. Velocity in this system is given in terms of azimuth (VEL-AZ), elevation (VEL-ELEV), and magnitude of the velocity vector (E.F.VEL). Azimuth is the angle between the projection of the velocity vector into the local horizontal plane and the north direction in this plane. Elevation is the angle between the velocity vector and the local horizontal plane. The local horizontal plane is defined as the plane perpendicular to the radius vector from the vehicle to the geocentric center of the earth. The geographic coordinate system is shown in Figure 18.
S.F. VEL FLT-PATH HEAD	Space-fixed velocity of the vehicle in the Geographic Coordinate System. Velocity is given in terms of flight-path angle (FLT-PATH), heading angle (HEAD) and magnitude of the velocity vector (S.F.VEL). The flight-path angle is the angle between the space-fixed velocity vector and the plane normal to the radius vector from the vehicle to

DEFINITIONS OF SYMBOLS (CONT'D)

Symbol	Definitions
S.F. VEL	the geocentric center of the earth, measured positive upward from this plane.
FLT-PATH	The heading angle is measured positive clockwise from north to the projection
HEAD	of the space-fixed velocity vector in the plane normal to the radius vector.
LAT	Geodetic latitude of vehicle.
MACH	Mach number.
ALTITUDE	Distance from subvehicle point to the vehicle's center of gravity measured along the radius vector from the vehicle to the geocentric center of the earth.
RANGE	Surface range measured along a spherical earth from the launch site to the subvehicle point.
Mean Sidereal Time	The Mean Sidereal Time is the angle between the mean vernal equinox and the Greenwich meridian for the epoch of midnight on the day of launch.
Orbital Element	The Orbital Element System is defined by six osculating elements of the two body ellipse with the reference body being determined by the body constants used, normally those of the earth. The elements are the semi-major axis of the ellipse; the eccentricity; the right ascension node (point of intersection of the orbital plane and earth equatorial plane); the inclination of the orbital plane to the earth equatorial plane; the argument of perigee or the angle between the ascending node and the perigee; the true anomaly or the angle between the perigee point and the satellite point. The various orbital elements are shown in Figure 18.

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SATURN SA-203 POSTFLIGHT TRAJECTORY

By Jonathan B. Haussler

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